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FEDERAL COORDINATOR FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

National Severe Local Storms Operations Plan

FCM 75-1

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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
FEDERAL COORDINATOR FOR METEOROLOGICAL
SERVICES AND SUPPORTING RESEARCH

NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

Supersedes National Severe Local Storms
Operations Plan - 1974

Washington, D.C.
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PREFACE

This is the eighth of an annual series of National Severe Local Storms Operations Plans that was developed after a 1967 request by the Federal Coordinator for Meteorological Services and Supporting Research. This plan outlines the responsibilities of the various United States agencies which provide meteorological services in observing and forecasting severe local storms.

Interdepartmental Severe Local Storms Conferences, of which there have been five, bring together cognizant Federal agencies to resolve problems of mutual concern related to the National Severe Local Storms Warning Service. Such conferences will be held every two years, if items warrant. National Weather Service Severe Local Storms Conferences, formerly held annually, are now on an as required basis.

This plan supersedes the 1974 version and reflects the recommendations of the 1974 Interdepartmental Severe Local Storms Conference and the Intra-National Weather Service Conference.

Clayton E. Jensen
Federal Coordinator for Meteorological
Services and Supporting Research

NATIONAL SEVERE LOCAL STORMS

OPERATIONS PLAN

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CHAPTER 1

RESPONSIBILITIES OF COOPERATING AGENCIES

1. The National Weather Service (NWS). It shall provide:

a. Basic surface, upper air, and radar observations from its network of stations making such observations.

b. Additional observations, when required, making all such reports available to any requesting agency on the appropriate teletypewriter communication circuits. Where feasible, standardized message headings and endings will be used when transmitting regular or special observations on teletypewriter circuits, especially the Radar Report and Warning Coordination (RAWARC) system.

c. Basic analyses and forecast charts through the National Meteorological Center (NMC), Suitland, Md.

d. Special Severe Weather Watch Bulletins and radar facsimile charts to the general public, aviation, and all concerned interests through the Severe Local Storms (SELS) Unit and the Radar Analysis and Development Unit (RADU) of the National Severe Storms Forecast Center (NSSFC) at Kansas City, Mo.

e. Statements, local warnings, and clearing bulletins through Weather Service Forecast Offices (WSFOs) and local Weather Service Offices (WSOs) throughout the United States.

f. Aviation Inflight Weather Advisories through WSFOs with aviation responsibilities for periods up to 4 hours for aircraft (civilian and military) and amendments to appropriate aviation forecasts whenever a severe local storm or storms are expected or are in existence.

g. A concerted effort to collect and relay Pilot Reports (PIREPS).

h. Appropriate public educational materials concerning the severe local storms warning service and development of community preparedness plans in accordance with the Defense Civil Preparedness Agency (DCPA)/National Oceanic and Atmospheric Administration (NOAA) Agreement on Community Disaster Preparedness.

2. The National Environmental Satellite Service (NESS). It shall:

a. Operate satellite systems capable of providing coverage of selected portions of the United States during the severe storms season.

b. Receive and respond to requirements for coverage of specific areas and times from NSSFC at Kansas City.

c. Provide appropriate satellite data to authorized research facilities either directly or through the Environmental Data Service (EDS).

d. Be available for conferences with personnel of NSSFC and other WSFOs, primarily through its Satellite Field Service Stations (SFSSs), either in person or by telephone.

e. Coordinate with the National Aeronautics and Space Administration (NASA) on providing data from its R&D satellites (ATS) to NOAA operational units for their use on an as required basis.

3. U.S. Air Force (USAF). The Air Weather Service is responsible for weather warning support to USAF and U.S. Army units throughout the world. It shall provide:

a. Basic surface, upper air, and radar observations from its network of stations making such observations.

b. Additional observations, when required, making all such reports available to any requesting agency on the appropriate teletypewriter communication circuits.

c. A concerted effort to collect and relay PIREPS.

d. Through the Air Force Global Weather Central (AFGWC), Offutt Air Force Base, Nebr.:

(1) Weather warning support in the conterminous United States and 200 miles offshore to:

(a) U.S. Air Force, U.S. Army, and selected U.S. Navy installations.

(b) Air National Guard and Air Force Reserve Units.

(c) Plant sites and facilities operated under Department of Defense (DOD) contracts.

(d) Airborne military aircraft when under military control.

(2) Via the USAF communications system:

(a) Military Weather Advisories for general areas in graphic form, four times daily, covering a 12-hour period, valid at 0300Z plus every six hours (filed at 0145Z plus every six hours).

(b) Point Warnings in plain language, as required, whenever weather is expected to meet warning criteria. These Point Warnings are issued to about 600 locations in the conterminous United States.

(c) Severe weather summaries of occurrences of severe convective activity.

(d) Further weather outlooks in plain language, twice daily, for the 6-hour period beyond the 0300Z and 1500Z advisories.

(e) A continuous meteorological watch on the possibilities of severe weather developments and of other weather phenomena for which AFGWC has warning responsibility.

4. The U.S. Navy.

The Navy does not operate a centralized Severe Local Storms Warning Service. Requirements for early warnings of hazardous flying conditions and local destructive phenomena are met by NSSFC/AFGWC products interpreted locally by Naval Weather Service Command personnel. Full use is made of information received on the National Facsimile Network (NAFAX), military, and civil weather circuits.

5. The Federal Aviation Administration (FAA). It shall provide:

a. Communication services in support of the Severe Local Storms Operations Program (Service A and Service C).

b. The PIREPS for use in Severe Local Storms Operations Program.

c. The Flight Service Station (FSS) and tower surface observations.

d. Distribution of Airmen's Meteorological Information (AIRMETS) and Significant Meteorological Information (SIGMETS) by FSS.

6. Exchange of Data Between Agencies.

a. There shall be a mutual exchange of relevant data on the part of all concerned agencies outlined in chapter 1. Because NSSFC and AFGWC are the units responsible for preparing severe weather forecasts, data concerning such forecasts will be exchanged between these units. Direct telephone communications between AFGWC and NSSFC may be made over the Federal Telecommunications Service (FTS) and Automatic Voice Network (AUTOVON) through the operators at Richards-Gebaur AFB, Mo.

b. The coordination channel for exchange of data between NSSFC and AFGWC shall be between the Commander, AFGWC, and the Director, NSSFC. Unresolved differences will be referred to the Emergency Warnings Branch, Meteorological Services Division, National Weather Service Headquarters, and to the Headquarters, Air Weather Service.

c. At the present time, only the National Weather Service, National Environmental Satellite Service, Environmental Research Laboratories' National Severe Storms Laboratory (NSSL), and the Air Weather Service are actively engaged in developing objective severe weather forecasting techniques. These organizations will engage, whenever possible, in a joint technique development program and will exchange any objective techniques developed.

7. Requests for Special Observations.

Any special rawinsonde or pilot balloon (PIBAL) observations needed during the continuous weather monitoring underway at NSSFC and at AFGWC are authorized and will be requested when needed.

When special upper air network soundings are required, they should normally be made at 1800Z. The Director, NSSFC, will initiate the request to the National Weather Service and National Aeronautics and Space Administration (NASA) stations, and the Commander, AFGWC, will similarly request soundings from DOD stations. Although other WSFOs have the authority to request special upper air observations during periods of potentially severe storms of all types, requests for special soundings during periods of potentially severe local storms should be made by SELS. Any cost involved in these special soundings will be borne by the agency making the sounding.

Air Weather Service requests for National Weather Service or NASA soundings should be made to the duty forecaster at NSSFC. National Weather Service requests for USAF soundings should be made to the AFGWC duty officer (FTS 402-221-3612 or 402-294-2586).

8. Backup Plan for SELS.

In the event that NSSFC (SELS) should be incapacitated or otherwise unable to discharge its severe weather forecasting functions, the AFGWC will provide backup for SELS. In the event of a power outage or other major disruption of operations, the SELS forecaster will make telephone contact with the designated AFGWC focal point and request backup. The SELS forecaster will also provide AFGWC with an estimate of the duration of the outage as well as subsequent updated information when available. The number of the last valid watch will also be provided.

Upon notification from SELS that the Backup Plan is to be implemented, AFGWC will prepare and transmit watches, outlooks and other advices regarding severe local storm activity as prescribed in Weather Service Operations Manual (WSOM) Chapter C-40. In addition, AFGWC will, as soon as practical, prepare and transmit NSSFC graphic NAFAX products (radar summary charts and severe weather outlook graphic). The AFGWC will initiate a suitably worded message for RAWARC and Service A indicating that emergency backup procedures are in effect and that subsequent severe weather watches, etc., will be issued by AFGWC as required.

Part A of all AFGWC backup watches will begin as follows: "The USAF Air Weather Service acting in a backup capacity for the National Weather Service has issued a . . . . . etc. Prior to issuance or cancellation of a watch, AFGWC will coordinate by telephone with the affected WSFOs if time permits. AFGWC will transmit backup material on RAWARC, Service A, and NAFAX.

When SELS resumes normal operation, a message to this effect will be placed on RAWARC and Service A by SELS.

9. Notification of Military Installations.

The NWS will notify selected military installations when severe convective weather (severe thunderstorm, tornadoes) is expected to affect such sites and the installation's AWS detachment is not manned by a forecaster or the station's radar is inoperative. The notification will be performed by selected NWS offices using radar and/or other information available. Notifications will be according to "alerting agreements" between the AWS/NWS offices concerned. Such agreements are initiated by the AWS units.

The service to be provided is a wakeup/alerting service to cover severe convective weather occurrences with short lead times, i.e. those developments that the AWS' normal alerting system may miss. No other service will normally be required. As appropriate, radar data may be exchanged. Severe convective weather is defined as thunderstorms with winds 50 knots and/or hail 3/4-inch in diameter or larger and tornadoes. Occurrence of these phenomena will be based upon actual sightings or radar indications.

Notification will be made to only one telephone number. Only one call will be made; however, if the line is busy, one additional call will be made. The notification will be made after the mass news media and civil defense authorities have been notified according to NWS' present warning dissemination procedures and priorities. The agreement will specify the hours during which the alerting service is to be provided.

9.1 Military/NWS Locations Involved.

Agreements for providing the alerting service have been signed between the following locations. Changes may be made to this list at any time.

Military Location	NWS Office
Bergstrom AFB	WSO Austin, TX
Buckley AFB	WSFO Denver, CO
Cannon AFB	WSO Amarillo, TX
Charleston AFB	WSO Charleston, SC
Columbus AFB	WSFO Jackson, MS
Craig AFB	WSO Montgomery, AL
Dobbins AFB	WSO Athens, GA
Dover AFB	Wilmington, DE
Ellington AFB	WSO Houston, TX
England AFB	WSO Alexandria, LA
Ft. Campbell	WSO Nashville, TN
Ft. Carson	WSO Colorado Springs, CO
Ft. Hood	WSO Waco, TX
Ft. Knox	WSO Louisville, KY
Ft. Leavenworth	NSSFC Kansas City, MO
Ft. Riley	NSSFC Kansas City, MO
Ft. Stewart	WSO Savannah, GA
Holloman AFB	WSO El Paso, TX
Homestead AFB	NHC Miami, FL

Military Location (Cont'd)	NWS Office (Cont'd)
Keesler AFB	WSO Mobile, AL
Kirtland AFB	WSFO Albuquerque, NM
Laughlin AFB	WSO Del Rio, TX
Little Rock AFB	WSFO Little Rock, AR
Maxwell AFB	WSO Montgomery, AL
McClellan AFB	WSO Sacramento, CA
Moody AFB	WSO Macon, GA
Myrtle Beach AFB	WSO Charleston, SC
Nellis AFB	WSO Las Vegas, NV
Peterson Field	WSO Colorado Springs, CO
Reese AFB	WSFO Lubbock, TX
Richards-Gebaur AFB	NSSFC Kansas City, MO
Scott AFB	WSFO St. Louis, MO
Selfridge AFB	WSFO Detroit, MI
Shaw AFB	WSO Charleston, SC
Sheppard AFB	WSO Wichita Falls, TX
Tinker AFB	WSFO Oklahoma City, OK
Tyndall AFB	WSO Pensacola, FL
Vance AFB	WSFO Oklahoma City, OK
Webb AFB	WSO Midland, TX
Whiteman AFB	NSSFC Kansas City, MO

CHAPTER 2

DEFINITIONS

This chapter defines those common meteorological terms, subject to multiple interpretations, which are used by agencies preparing severe local storms forecasts and warnings.

1. Funnel Cloud. A violent, rotating column of air which does not touch the ground and is usually pendant from a cumulonimbus cloud.

2. Severe Local Storms. Dangerous storms that usually cover relatively small geographical areas and periods of time and are of sufficient intensity to threaten life and property. For the purpose of this plan, a severe local storm is a tornado, funnel cloud, waterspout or a thunderstorm with winds of 50 knots or greater and/or hail 3/4-inch in diameter or greater at the surface.

3. Severe Local Storms Season. Although the center of maximum frequency shifts during the year, tornadoes and severe thunderstorms occur somewhere in the United States every month of the year. The months of greatest total frequency are April, May, and June.

4. Squall Line. A line of active thunderstorms or squalls which may extend over several hundred miles. It is the phenomenon of the mature or active stage of "instability-line" development and may be either a solid or broken line of thunderstorms.

5. Thunderstorm Density Categories. The following adjectives describe the expected density of severe thunderstorms in a severe weather watch area. They may be used to indicate the expected density in an instability line moving through a watch area.

a. Isolated--an extremely small number are expected.

b. Few--up to 15 percent coverage.

c. Scattered--16 to 45 percent coverage.

d. Numerous--more than 45 percent coverage.

e. MIC (Maximum Instantaneous Coverage)--the percentage of the area that will be covered by cumulonimbus cells at the time of maximum activity.

f. TAA (Total Area Affected)--the percentage of the area that will experience one or more thunderstorms during the applicable valid period. The last two terms are used in Military Weather Advisories.

Adjectives such as the above will not be used to indicate the expected density of tornadoes. The Tornado Watch Bulletin will only state that the threat of tornadoes exists in the designated watch area.

6. Thunderstorm Intensity Categories. Only the following thunderstorm intensity classes will be used in the forecasting and warning functions of concerned agencies.

a. Thunderstorm--Wind gusts less than 50 knots and hail, if any, of less than 3/4-inch diameter at the surface.

b. Severe Thunderstorm--Wind gusts of 50 knots or greater or hail of diameter 3/4-inch or greater at the surface.

7. Tornado. A violent, rotating column of air which forms a pendant, usually from a cumulonimbus cloud, and touches the ground. It nearly always starts as a funnel cloud and is accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena.

8. Waterspout. A funnel cloud which forms over a body of water--such as a bay, lake, or gulf--and touches the water.

CHAPTER 3

FORECASTS AND WARNINGS

1. General. Although every effort has been made to standardize terminology, adopt common definitions, and adjust criteria to a common base, each agency has differing operational warning criteria that must be met. Therefore, standardization will be used wherever possible in forecasts and warnings. Each agency, however, retains the right to specify the forecast and warning criteria that are needed to carry out the mission of its service. The common criteria and differences will be discussed in the following sections.

2. Other Warning Criteria. All phenomena (other than those classified as severe storms, Chapter 2, Item 2) described in the various warnings, bulletins, and advisories should be categorized as "other warning criteria" and are not called severe weather phenomena. Such other warning criteria will be listed separately in appropriate National Oceanic and Atmospheric Administration (NOAA)/National Weather Service and U.S. Air Force (USAF)/ Air Weather Service publications.

3. National Weather Service Watch/Warning Procedures.

3.1 General. Although the National Weather Service has statutory responsibility for providing a Severe Local Storms Warning Service for all 50 states, because of the low frequency of severe local storms in Alaska and Hawaii and the differing nature of weather problems, these two states are not included in the national plan that is centered on the NSSFC. Instead, the WSFOs at Anchorage and Honolulu have the responsibility for maintaining weather watches and issuing warnings as needed for their respective states, Alaska and Hawaii. Procedures described in this plan are followed to the extent that they are applicable.

This Warning Service is available to the general public and to general and commercial aviation and is provided through the National Severe Storms Forecast Center (NSSFC) at Kansas City, the National Meteorological Center (NMC) at Suitland, the Weather Service Forecast Offices (WSFOs), the local Weather Service Offices (WSOs), and Satellite Field Service Stations (SFSSs).

3.2 Watch/Warning Criteria. The criteria for aviation and public severe weather watch and warning bulletins are the same. Any or all of the categories listed below may be mentioned in such bulletins to indicate more fully the severe weather expected or occurring.

a. Severe Thunderstorm:

(1) Damaging wind--sustained or gusty surface winds of 50 knots or greater and/or

(2) Hail--at the surface of 3/4-inch or larger. The word hail in a watch bulletin implies hail at the surface as well as aloft unless qualifying phrases such as "hail aloft" are used.

b. Tornado:

(1) Severe weather watches/warnings that mention tornadoes imply that thunderstorm activity, usually severe, is also expected/occurring. Funnel clouds are not forecast in severe weather watch bulletins.

(2) Distances from reference points in combined watch bulletins will be expressed in both statute and nautical miles (to the nearest 5 miles), and specified in Section A whenever 20 nautical miles or greater. No specification will be used when distances are 15 nautical miles or less. When separate aviation severe weather watch bulletins are issued, distances will be expressed in nautical miles.

3.3 NMC. NMC is the central data processing center responsible for the issuance of prognostic charts, discussions, and other material that may be helpful in calling the attention of NSSFC and WSFOs to situations which require issuances of watches.

3.4 NSSFC. NSSFC, through its SELS unit, is responsible for issuing and cancelling severe local storm watches and for preparing other appropriate material essential to the Severe Local Storms Warning Service.

a. Combined Public and Aviation Watch Bulletins. Although a warning service is provided for public and aviation interests, separate watches are not issued for these interests but are combined into one bulletin. Each combined watch bulletin (fig. 3-1) contains information for the general public (sections A and B) and aviation interests (sections C to E) in discrete, alphabetical, sequential sections. When a section is not applicable, it is left out. The location of the area affected and the valid period of the watch which are common to both public and aviation sections are given in Section A. The bulletin is designated as either a severe thunderstorm or tornado watch bulletin, depending upon the phenomena expected. Such bulletins are numbered serially beginning with number 1 for the first issuance of each calendar year. Unnumbered bulletins called "Tornado (Severe Thunderstorm) Watch Cancellation Bulletins" will be issued when a watch is cancelled.

b. Separate Aviation Watch Bulletins. Separate aviation severe weather watch bulletins (fig. 3-2) will be issued only when a Hurricane Warning Office (HWO) is issuing advisories calling for tornadoes, or when extreme turbulence and hail aloft are expected along the air routes from Tampa to New Orleans and from New Orleans to Brownsville. Such information is contained in appropriate Hurricane and Tropical Storm Advisories. For these aviation bulletins, a numbering system which is compatible with that of the combined watches will be used. Alphanumeric numbers which consist of capital letters alphabetically appended to the last assigned combined watch number will be used. For example, 404A, 404B, etc.

BULLETIN
BROADCASTERS PLEASE REPEAT THIS BULLETIN FREQUENTLY
TORNADO WATCH NUMBER 451
ISSUED 455 PM CDT SEPTEMBER 29, 1974

A. THE NATIONAL SEVERE STORMS FORECAST CENTER SAYS THE POSSIBILITY OF TORNADOES EXISTS FOR.....

NORTHERN MISSISSIPPI
SOUTHEASTERN ARKANSAS
NORTHEAST LOUISIANA

THE THREAT OF TORNADOES AND SEVERE THUNDERSTORMS WITH LARGE HAIL AND DAMAGING WINDS WILL EXIST FROM 5 PM CDT UNTIL 9 PM THIS SUNDAY EVENING.

THE WATCH AREA IS ALONG AND 70 MILES...60 NAUTICAL...EITHER SIDE OF A LINE FROM 30 MILES...25 NAUTICAL...NORTH OF COLUMBUS MISSISSIPPI TO ELDORADO ARKANSAS.

REMEMBER A TORNADO WATCH MEANS TORNADOES AND SEVERE THUNDER-STORMS ARE LIKELY WITHIN THE WATCH AREA...PERSONS IN OR CLOSE TO THE WATCH AREA SHOULD BE ON THE LOOKOUT FOR THREATENING WEATHER CONDITIONS AND LISTEN FOR LATER STATEMENTS AND WARNINGS.

B. OTHER WATCH INFORMATION...

THIS TORNADO WATCH REPLACES TORNADO WATCH NUMBER 449 ISSUED AT 130 PM CDT...WATCH NUMBER 449 WILL NOT BE EFFECTIVE AFTER 5 PM CDT.

C. TORNADOES AND A FEW SVR TSTMS WITH HAIL SFC AND ALF TO 1 IN. EXTRM TURBC AND SFC WND GUSTS TO 65 K. SCTD CBS WITH MAX TOPS TO 550. MEAN WIND VECTOR 24035.

D. INSTBLTY LN FM WRN TENN ACRS CNTRL ARK INTO NE TEX MOVG SEWD ABT 25 K.

E. OTHER TSTMS. CONTD RMNDR AC.

Figure 3-1.

EXAMPLE OF COMBINED SEVERE WEATHER WATCH BULLETIN.

BULLETIN
AVIATION SEVERE WEATHER WATCH NUMBER 290A
TORNADO WATCH VALID 1200Z TO 1800Z

A...ALG AND 80 NM EITHER SIDE OF A LN FM 80 NM NORTH NORTHEAST
OF ORLANDO FLORIDA TO DOTHAN ALABAMA.

B...TORNADOES AND A FEW SVR TSTMS. EXTRM TURBC AND SFC WND GUSTS
TO 65K. SCTD CBS WITH MAX TOPS TO 500.

C...SVR TSTMS OR TORNADOES ASSOCIATED WITH HURRICANE AGNES. SEE
LATEST HURR ADVSY.

D...CONT 288A UNTIL EXPIRATION AT 12Z.

Figure 3-2.

EXAMPLE OF AVIATION SEVERE WEATHER WATCH BULLETIN.

c. Functions of the Radar Analysis and Development Unit (RADU). An important adjunct of NSSFC is RADU. The Radar Facsimile Charts transmitted on the National Weather Facsimile Network (NAFAX) are prepared by this Unit. Although RADU prepares a Radar Summary Chart hourly, only those Charts required by the NAFAX schedule are transmitted on NAFAX. Every hour, insofar as practicable, RADU utilizes all available radar data. In the event that it is necessary to omit some reports, the areas of minimum significance will be omitted and this fact indicated on the Radar Facsimile Chart. The military service weather radars in the intermountain area are acceptable substitutes for S-band radar and can furnish data, routinely and as requested, for the Radar Summary Charts. However, the National Weather Service prefers to use the radar composite (page 32), prepared by its radar unit at the Salt Lake City, Utah, Air Route Traffic Control Center (ARTCC), as the western portion of these Charts to avoid duplication. In addition, more radar data are available from the ARTCC radars as the result of their location on mountain peaks, and the method of tracing the data from individual radarscopes.

d. Other SELS Guidance Material. Guidance material such as the Severe Weather Outlook Narrative, Severe Weather Outlook Graphic, Status Reports and All-Clear Information on Weather Watches (WW), Advance Information on Watch Area, and Watch Cancellation Bulletins will be released as appropriate.

3.5 Weather Service Offices (WSO)*

a. That portion, sections A and B, of the combined Severe Weather Watch Bulletins of general interest to the public is distributed immediately to the public in accordance with the County Responsibility Plan of each WSO whenever a threat to any part of the area of county responsibility is indicated by the Bulletin. To help the public visualize which areas are affected by the watch, the affected areas are restated in terms of counties, geographical areas, or prominent cities in a release called a redefining statement. Publications and distribution of various types of material have made the public aware of the National Weather Service's Severe Local Storms Warning Service and its terminology.

b. Warning responsibility for the general public is vested in local WSOs. Severe weather warnings will be issued immediately by the appropriate WSO whenever reports of actual or suspected severe weather in or near an Office's area of responsibility indicate an imminent threat. Each warning will be identified as a Severe Thunderstorm Warning Bulletin or Tornado Warning Bulletin. Full advantage is taken of radar observations in issuing Tornado and Severe Thunderstorm Warning Bulletins. When radar evidence is sufficient in the judgment of the responsible official to identify a dangerous storm, Warning Bulletins based on these data are issued immediately. Clearing bulletins are issued for all or parts of an Office's area of county responsibility whenever the threat of severe weather has ended.

*WSOs in this paragraph refer to both WSOs and WSFOs with county warning responsibility.

c. Severe weather statements are issued, to provide information on developing severe weather, on lack of such development, or on severe weather which has occurred or is in existence.

3.6 Weather Service Forecast Offices (WSFO). WSFOs with aviation responsibilities (FA Centers) put severe weather information contained in watch bulletins into Significant Meteorological Information (SIGMETS) and Airmen's Meteorological Information (AIRMETS). Potentially hazardous flight conditions specified in WWs which are adequately covered in an aviation forecast are not the subject of an AIRMET. FA Centers advise Air Route Traffic Control Centers (ARTCC) of any SIGMETS they issue which affect the respective ARTCC areas. Appropriate reference is also made to expected severe weather in scheduled and amended public and aviation forecasts, Pilots Automatic Telephone Weather Answering Service (PATWAS), and Transcribed Weather Broadcast (TWEB) scripts.

Criteria for the issuance of SIGMETS associated with severe local storms include:

a. Tornadoes.

b. Lines of thunderstorms (squall lines).

c. Embedded thunderstorms.

d. Hail of 3/4-inch or greater in diameter.

e. Severe or extreme turbulence.

f. Severe icing.

3.7 Satellite Field Service Stations (SFSSs). The SFSSs receive and analyze satellite pictures in near real time and assist NSSFC and WSFOs in applying these data to their severe storm forecasting and warning programs.

4. U.S. Air Force (USAF) Warning Procedures

a. General. The Air Force Global Weather Central (AFGWC) provides, by means of USAF communications system, warnings for:

(1) Tornadoes.

(2) Thunderstorms.

(3) Strong surface winds of 35 knots or more that are not associated with thunderstorms.

(4) Heavy rain or snow (2 inches or more in a 12-hour period).

(5) Freezing precipitation.

b. Military Weather Advisories. AFGWC issues Military Weather Advisories in graphic teletypewriter format (see fig. 3-3 and 3-4) four times daily, at 0145Z plus every six hours. Each Advisory covers a 12-hour period, with valid time 0300Z plus every six hours. Similar Advisories are issued in facsimile format on circuit AFX109. Each Advisory gives the areas where any of the weather elements listed above are expected to occur in the following 12-hour period. An Advisory is an estimate of the weather-producing potential of the existing synoptic pattern and airmasses, based on the assumption that subsequent changes in these features occur as forecast.

(1) Purpose and Use. The Military Weather Advisories are designed to provide basic guidance to both the field forecaster and to the point warning forecasters at AFGWC. These Advisories are issued at fixed times; preparation time is limited by data availability and presentation format. Advisories may cover fairly large areas as in the case of thunderstorms, snow, and strong gradient winds, but the areas of more severe weather--such as tornadoes and severe thunderstorms--are usually more limited in time and space. Field forecasters should use Military Weather Advisories:

a. To alert themselves and users to potential areas of significant weather.

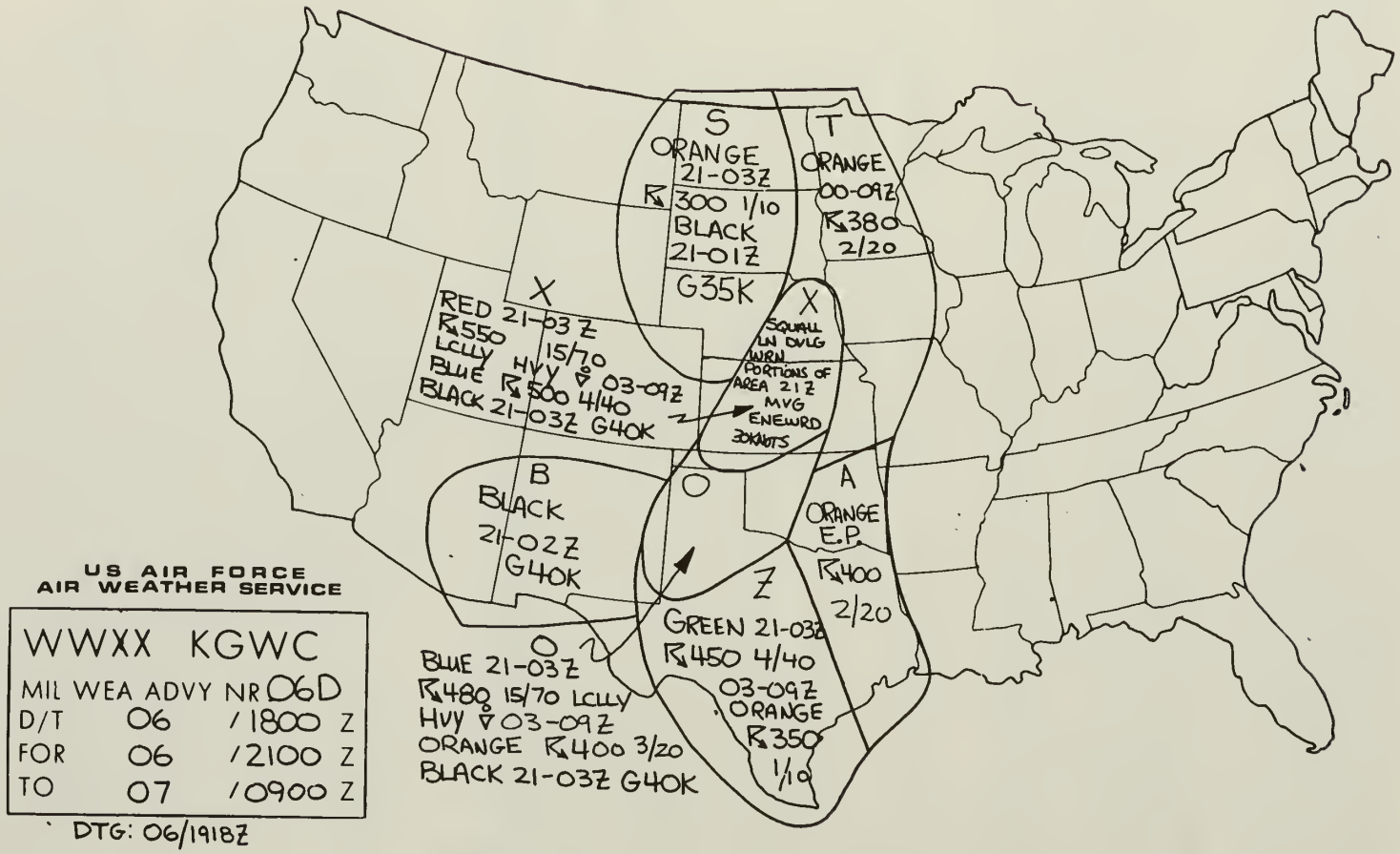
b. To use as ready-made briefing aids.

c. To indicate the probability of their stations being directly affected during the advisory period.

(2) Amendment. Advisories are amended whenever the elements describe change, or are expected to change, by one category or more and whenever area boundaries change, or are expected to change, by 60 miles or more.

(3) Geographical Interpretation. A clear plastic overlay containing a scaled outline of the conterminous States, placed on the teletypewriter message containing the Military Weather Advisory, will provide geographical orientation.

c. AFGWC Point Warnings. AFGWC Point Warnings are issued in plain language (fig. 3-5) for the same phenomena as Advisories. While Advisories provide general guidance to all military forecasters in terms of large- and intermediate-scale synoptic developments, AFGWC Point Warnings are issued for and to specific locations in the smallest scale of space and time consistent with the availability of data and the state of the art. An effort is made to tailor the size of the points to the requirements of the using agency. The locations for which AFGWC has warning responsibility are listed in Volume II, Air Weather Service Manual 105-2. Some of the locations include two, three, or four installations in one locality; the total number of installations is approximately 600. Approximately 50 percent of these locations are U.S. Air Force, 45 percent are U.S. Army, and 5 percent are U.S. Navy. In addition to active military installations, AFGWC Point Warnings are issued for National Guard units, arsenals, ammunition plants, and other civilian activities under contract to the Department of Defense (DOD).



US AIR FORCE
AIR WEATHER SERVICE

WWXX KGWC		
MIL WEA ADVY NR	06D	
D/T	06	/1800 Z
FOR	06	/2100 Z
TO	07	/0900 Z

DTG: 06/1918Z

Figure 3-3.

EXAMPLE OF DESCRIPTION PORTION OF A MILITARY WEATHER ADVISORY.

Figure 3-4.

EXAMPLE OF GRAPHIC PORTION OF MILITARY WEATHER ADVISORY.

Ø Ø32Ø1ØZ
WWXX WWXX WWXX 3 KGWC Ø32Ø1ØZ
TX 18-19

THUNDERSTORMS WITH 1 1/2 INCH HAIL AND SW GUSTS TO 65 KNOTS VALID Ø322ØØZ TO Ø4Ø2ØØZ TORNADO VALID Ø322ØØZ TO Ø4Ø1ØØZ.

OK 7-8

THUNDERSTORMS WITH NO HAIL AND SW GUSTS TO LESS THAN 35 KNOTS EXPECTED BETWEEN Ø319ØØZ AND Ø4Ø3ØØZ.

Figure 3-5.

EXAMPLE OF MILITARY POINT WARNING.

AFGWC Point Warnings are issued for specific locations as the situation warrants in contrast to Advisories which are issued at scheduled intervals for fixed valid periods. AFGWC Point Warnings are amended, extended, or cancelled as necessary. For accuracy, the optimum leadtime is that just long enough to permit necessary protective action.

AFGWC Point Weather Warnings:

(1) Provide specific warning to an installation where a forecast unit is not assigned.

(2) Alert a responsible individual at locations with a limited forecast service.

(3) Alert and guide the field forecaster who has final responsibility for warning the agency he supports.

d. Local AWS Unit Point Warnings. At those locations where an Air Weather Service (AWS) forecaster is on duty, the forecaster has final responsibility for warning those agencies being supported. The criteria and lead time for such local point warnings are established locally based on customer needs.

5. Distribution of Watches, Warnings, and Severe Weather Reports by Flight Service Stations (FSSs)

This Plan does not provide for the distribution of severe weather information by FSSs. However, these Stations occasionally receive requests for such information or are given a severe weather report by an observer. Such information or requests will be referred to the WSO having jurisdiction over the county in which the requester or phenomenon is located. Appendix 1 illustrates, by region, the WSOs and their warning responsibility areas; the FSSs should refer the requester or information to these Offices. The Federal Aviation Administration (FAA) and National Weather Service will develop the communication methods for assuring that these requests and reports reach the appropriate WSO.

CHAPTER 4

COMMUNICATIONS

1. National Weather Service Systems

a. RAREP (Radar Report) and Warning Coordination (RAWARC). The National Weather Service internal teletypewriter system is a landline teletypewriter network consisting of five circuits, which terminates at the National Severe Storms Forecast Center (NSSFC) in Kansas City, the network monitoring office (fig. 4-1). Traffic on RAWARC is basically unscheduled and is handled according to a priority system, with severe weather information having the highest priority. Relays between RAWARC circuits are made by computer, with severe thunderstorm, tornado and flash flood warnings having the highest priority. Such messages break and supersede all transmissions other than similar warning messages. The only regularly scheduled material entered on RAWARC is an hourly collection (H+35) of radar reports (SD). Special radar reports and other material can be transmitted at any time the circuits are not in use.

b. NOAA Weather Wire Service (NWWS). The NWWS consists of local loops serving metropolitan areas, Statewide intrastate circuits, and overlay circuits. The purpose of NWWS is to transmit consumer-oriented forecasts, watches, weather warnings, and meteorological data to the mass news media for broadcast to the public. Various specialized users also obtain drops on NWWS to meet their requirements.

Each intrastate circuit has one Weather Service Office (WSO) designated as the State Relay Center (SRC). The SRC is connected to the regional overlay interstate circuit and serves as the State relay point for transmissions over this regional circuit to other States through their SRCs. Washington, D.C., is the Overlay Relay Center and is responsible for relaying traffic between regional overlay circuits.

Only WSOs (or certain other authorized offices) have direct entry on these circuits. The Weather Service Forecast Offices (WSFO) furnish broad-scale information and local WSOs enter local information. Relays between adjacent circuits are established as necessary to meet the requirements of the National Weather Service's Severe Local Storms Warning Service and of subscribers located along State or area borders. When urgent material such as a warning is transmitted, a prearranged bell signal is used to attract the attention of users to the transmission.

Figure 4-2 shows the areas covered, the SRCs, the regional overlay circuits, and the Washington Overlay Relay Center.

c. National Warning System (NAWAS). This is the Defense Civil Preparedness Agency (DCPA)-operated hot line interstate telephone system which connects DCPA Warning Points and WSOs within each State and between States. Figure 4-3 gives the location of DCPA warning points. The NWS's 218 intrastate and 71 interstate drops are shown in figure 4-4.

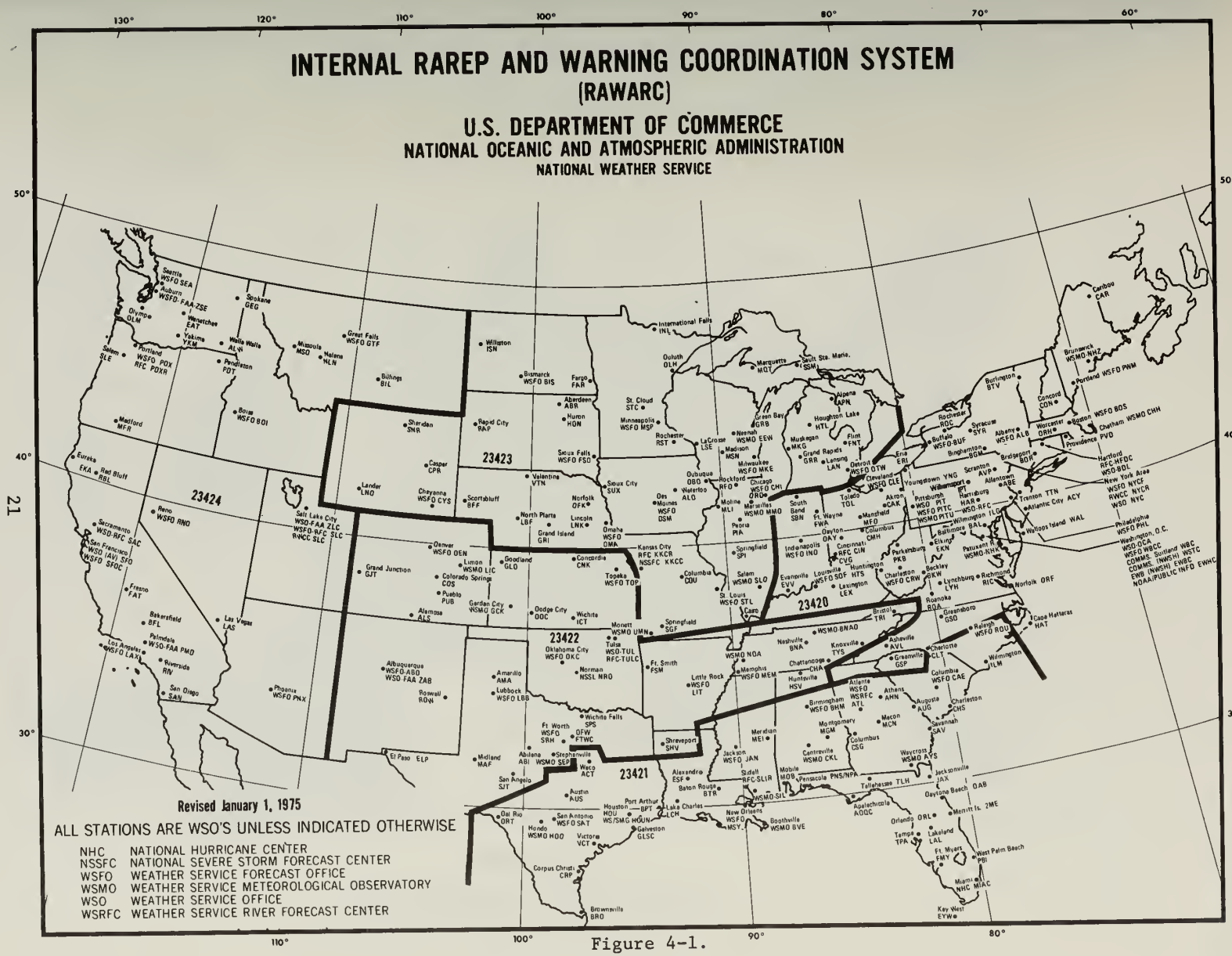


Figure 4-1.

RAWARC TELETYPEWRITER SYSTEM.

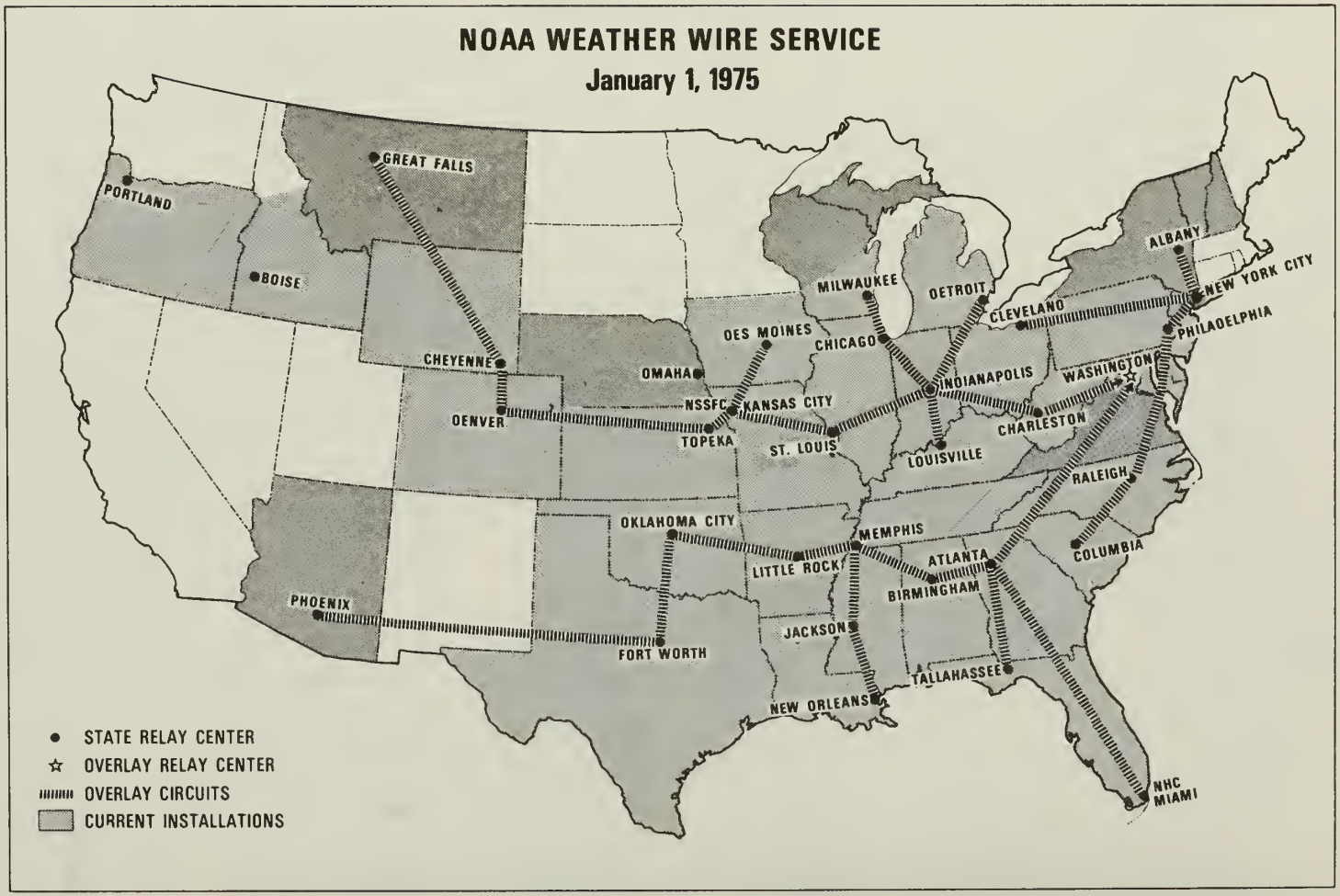


Figure 4-2.

NOAA Weather Wire Service.

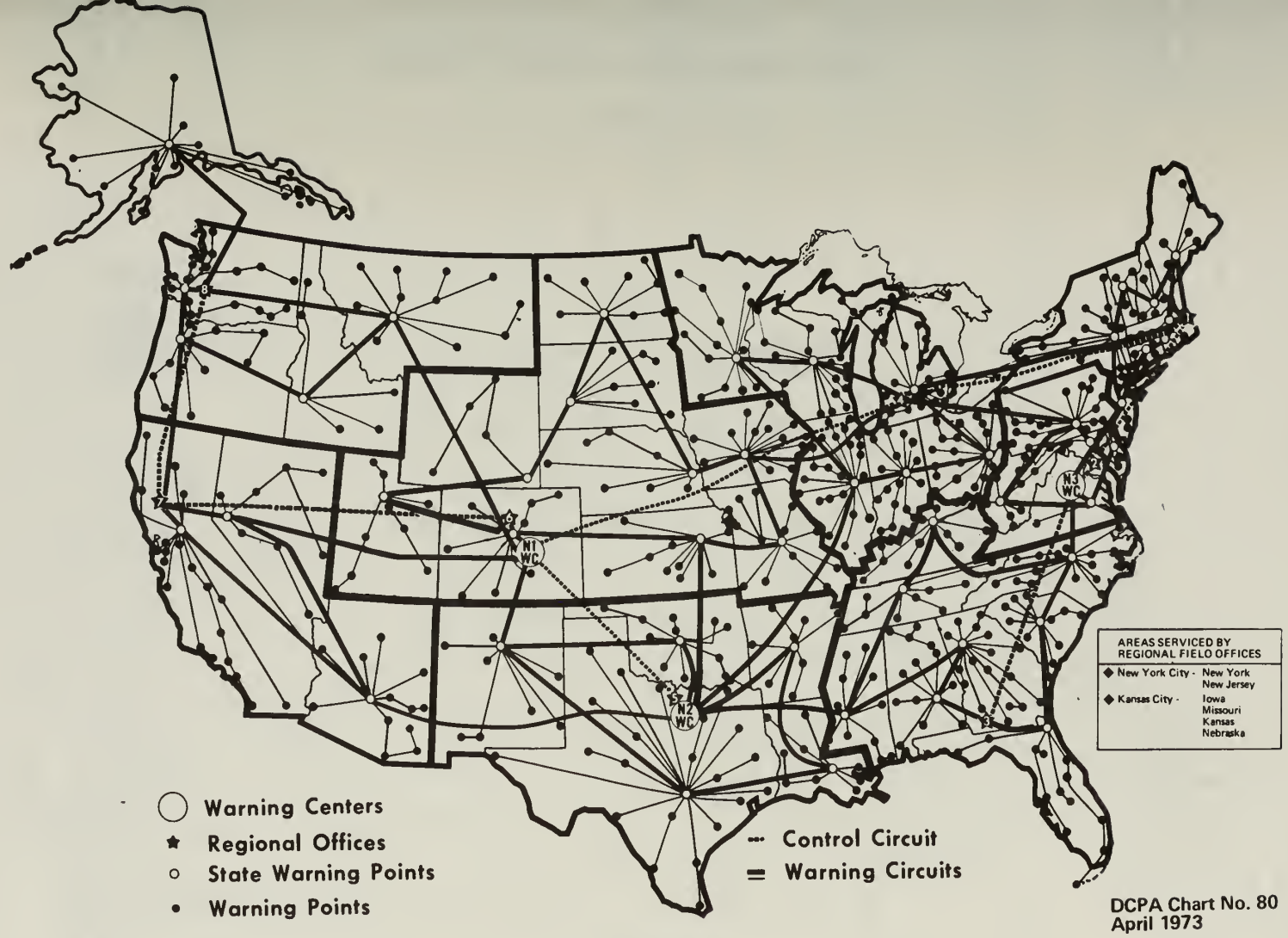


Figure 4-3.

DEFENSE CIVIL PREPAREDNESS AGENCY
NATIONAL WARNING SYSTEM

NATIONAL WEATHER SERVICE NAWAS LOCATIONS
JANUARY 1, 1975
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
LEGEND:
INTRASTATE LOCATION
INTERSTATE CONNECTION - ARROW TERMINATES IN THE STATE ON WHOSE NAWAS CIRCUIT THE OFFICE LOCATED AT THE ARROWS ORIGIN IS CONNECTED.
REGIONAL NETWORK TERMINATING AT HARTFORD, CT (RFC)

Figure 4-4.

NATIONAL WEATHER SERVICE NAWAS DROPS.

d. Emergency Action Notification Signal (EANS). Although all standard, FM and television broadcast stations may, at their discretion, use the EANS for short-fused warnings, only a few use it. Where its use is acceptable, EANS should be requested for all tornado warnings. Since EANS use is at the discretion of the individual stations, arrangements for its use is made prior to the severe local storm season, unless such use is a continuing agreement. In those areas where it is not an acceptable procedure, all tornado warnings carry the notation "Immediate Broadcast Requested." EANS is not requested for severe thunderstorm warnings.

e. Very High Frequency (VHF) Radio Weather. The WSOs/WSFOs equipped with VHF radio can transmit continuous weather warnings over a frequency of 162.55 MHz or 162.40 MHz (fig. 4-5). These radio transmitters provide continuous weather information over an area of about 40-mile radius. Local radio and TV stations can copy and rebroadcast the material even though land lines in the area may be disrupted. These transmitters have a tone-alert capability which can be used to activate specially designed muted receivers. This signal is transmitted at 1050 Hertz for 3-5 seconds before announcements of hazardous weather conditions.

f. Miscellaneous. Other types of distribution methods are used, as appropriate, to make warnings available to other WSOs/WSFOs and to the public as rapidly as possible. In a severe weather situation, the NWWS is given first priority and others are used as time is available. These other methods include:

(1) Telephone (including NAWAS).

(2) Radio and Teleprinter Networks.

(3) Public Service Teleprinter Networks.

(4) Press associations and news services.

(5) Amateur radio.

(6) State Police and Highway Radio and Teleprinter Networks.

(7) State Civil Defense Teleprinter Networks.

(8) Sirens.

g. Distribution of Severe Weather Watch and Warning Bulletins. The communication systems used for distributing Public Severe Weather Watch and Warning Bulletins are shown in figure 4-6. The communication systems used for distribution of Aviation Severe Weather Watch Bulletins and In-Flight Weather Advisories are outlined in figure 4-7.

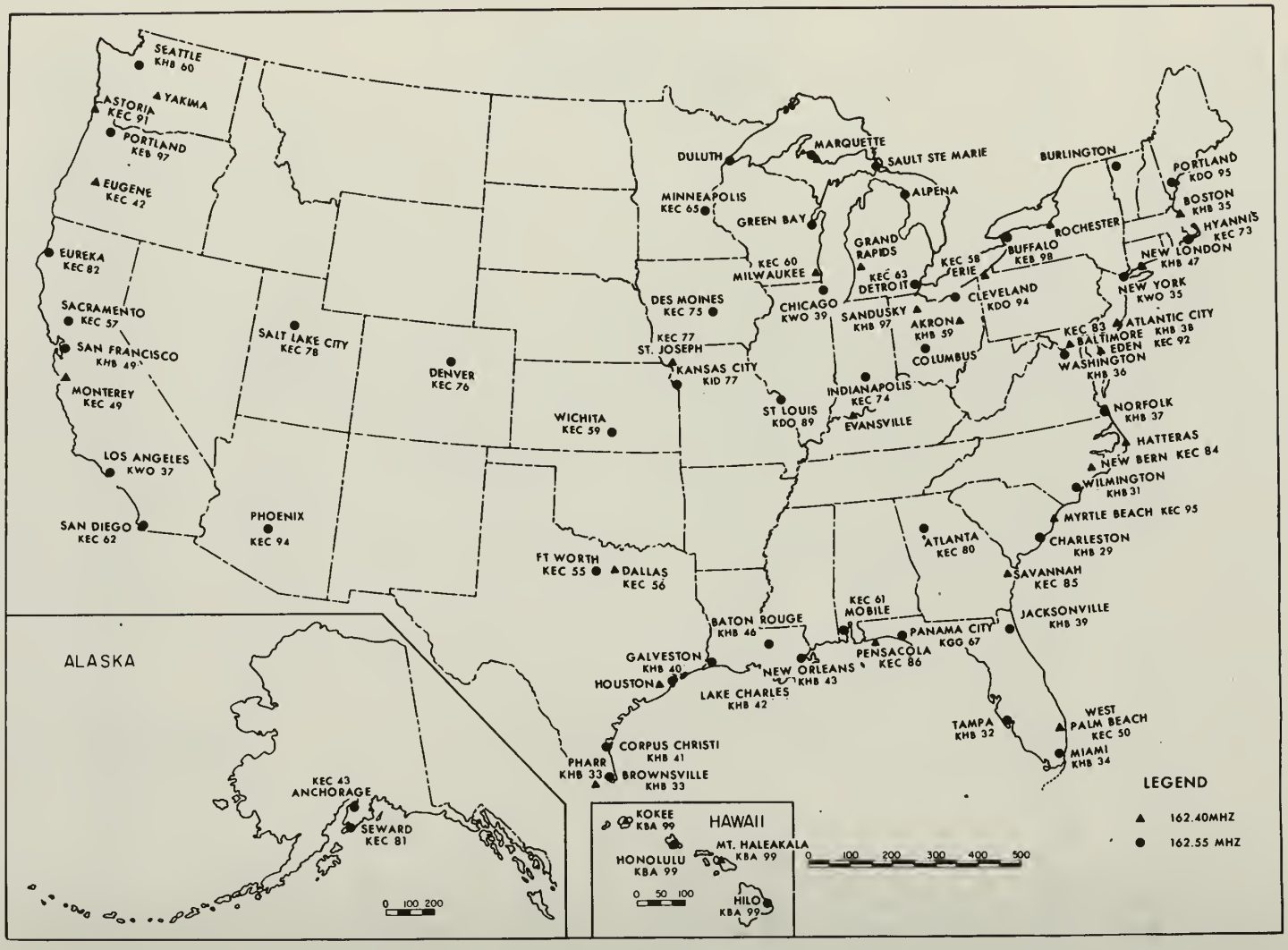


Figure 4-5.

VHF-FM Weather Transmissions.

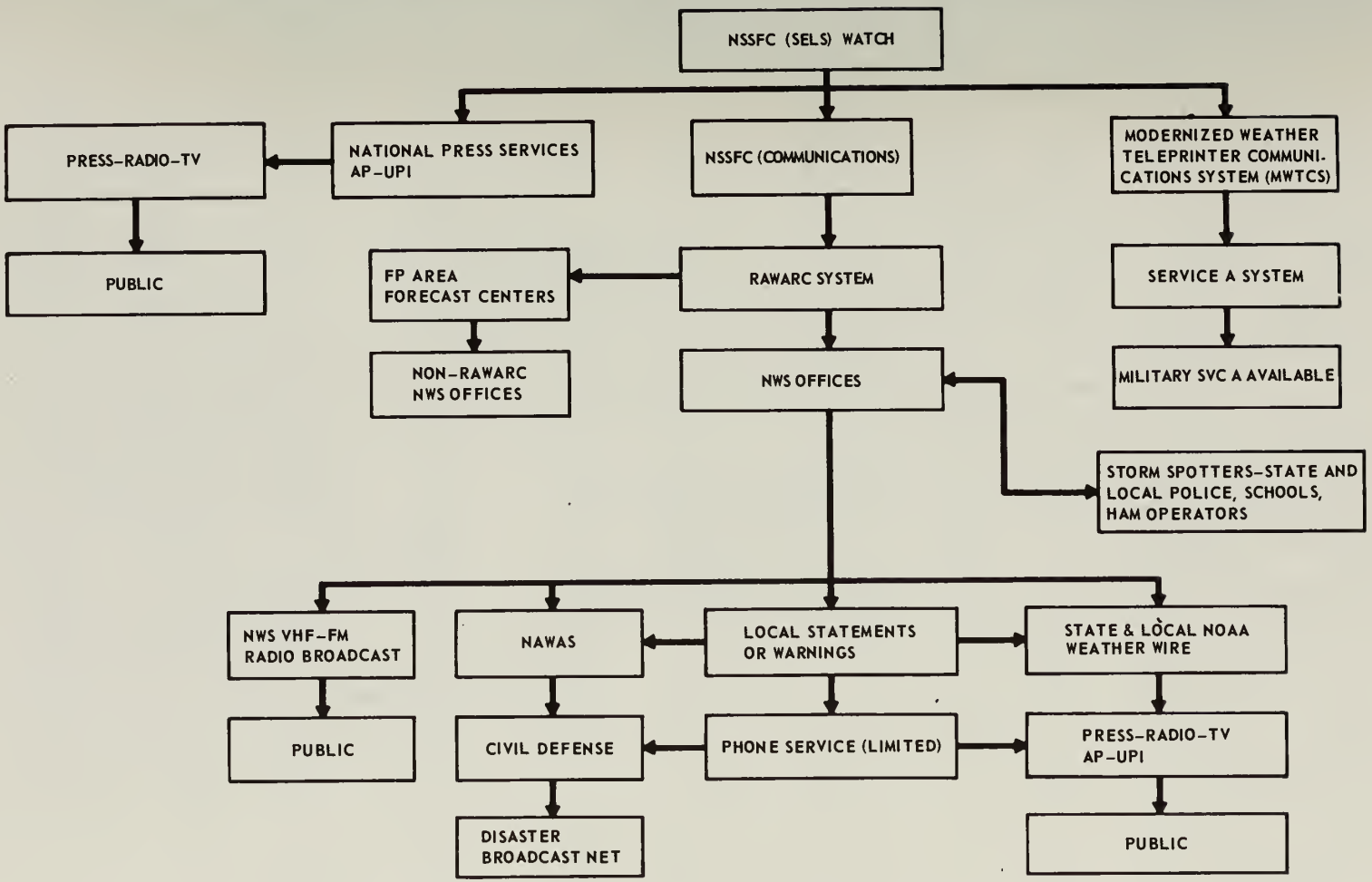


Figure 4-6.

DISTRIBUTION OF COMBINED SEVERE WEATHER WATCH AND WARNING BULLETINS.

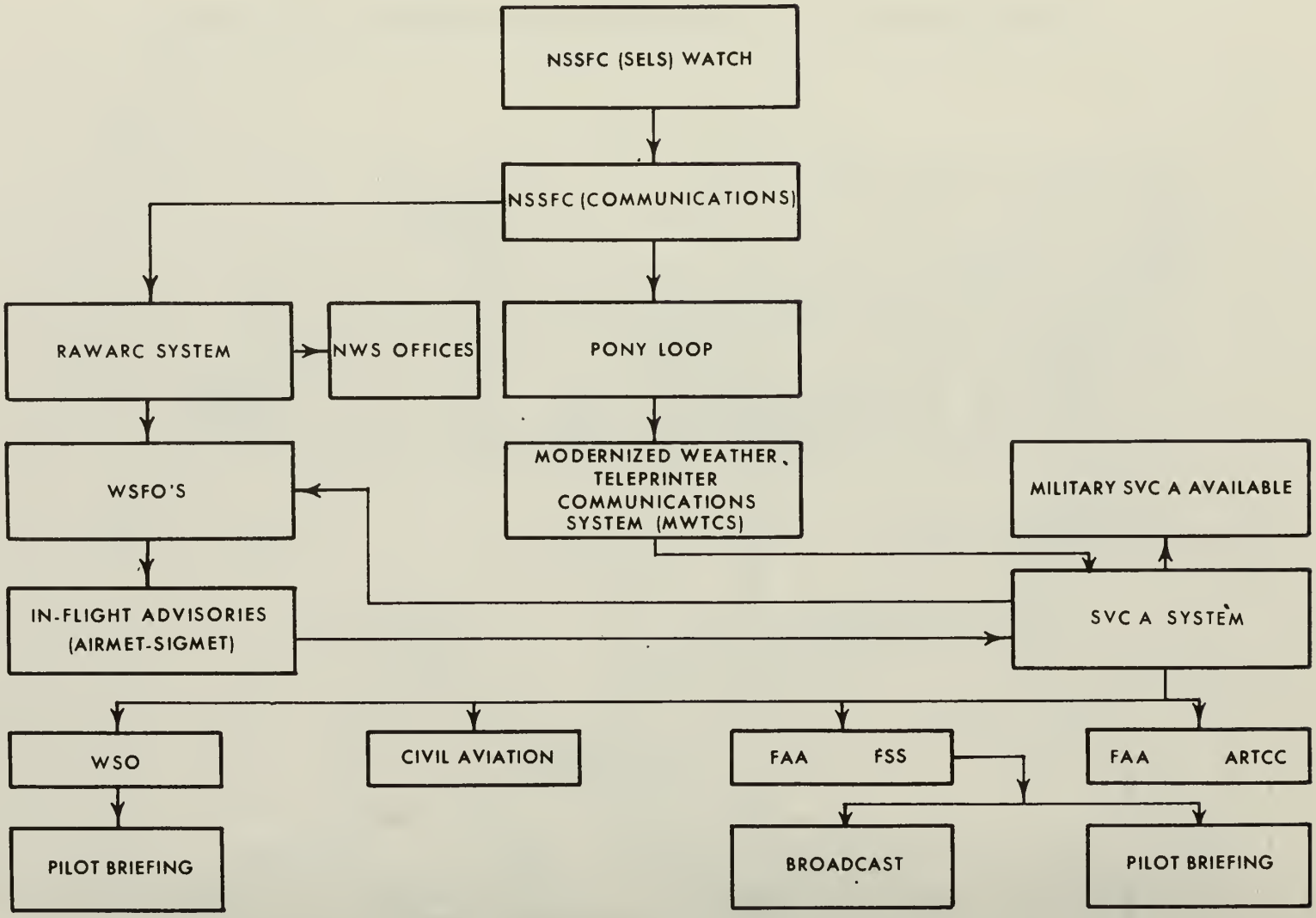


Figure 4-7.

DISTRIBUTION OF AVIATION SEVERE WEATHER WATCH BULLETINS - AIRMET AND SIGMET.

2. U.S. Air Force (USAF) Systems

a. Within the conterminous United States, USAF radar weather observations are collected by means of the Continental U.S. Meteorological (COMET) IIA System and disseminated by the COMET IIB System. Reports collected by means of COMET IIA are transmitted from the Carswell Automatic Digital Weather Switch (CADWS) to the Air Force Global Weather Central (AFGWC), the FAA Weather Message Switching Center (WMSC), and to the National Meteorological Center (NMC) through computer-to-computer links; severe radar reports are available to NSSFC/Radar Analysis and Development Unit (RADU) on COMET IIB (bulletin WOUS 1 KAWN) and the routine radar reports transmitted from WMSC to NSSFC.

b. The COMET II System is divided into eight geographic areas, with a collecting and disseminating circuit covering each area (fig. 4-8).

c. The COMET II System is used to disseminate Military Weather Advisories and Point Warnings issued by AFGWC.

3. Federal Aviation Administration (FAA) Systems

a. Service A (fig. 4-9) will be used for the collection and distribution of severe local storms information as follows:

(1) Hourly and Special Airway Observations.

(2) Airmen's Meteorological Information (AIRMETS) and Significant Meteorological Information (SIGMETS).

(3) Hourly Radar Summaries from National Weather Service radar units at Air Route Traffic Control Centers (ARTCC).

(4) Hourly Radar Reports.

b. Service A will be used for distribution of Pilot Reports (PIREPS) from Flight Service Stations (FSSs) to WSFOs with aviation responsibilities.

4. U.S. Navy.

U.S. Navy weather reports are collected by means of the USAF COMET IIA System and are disseminated by the COMET IIB System.

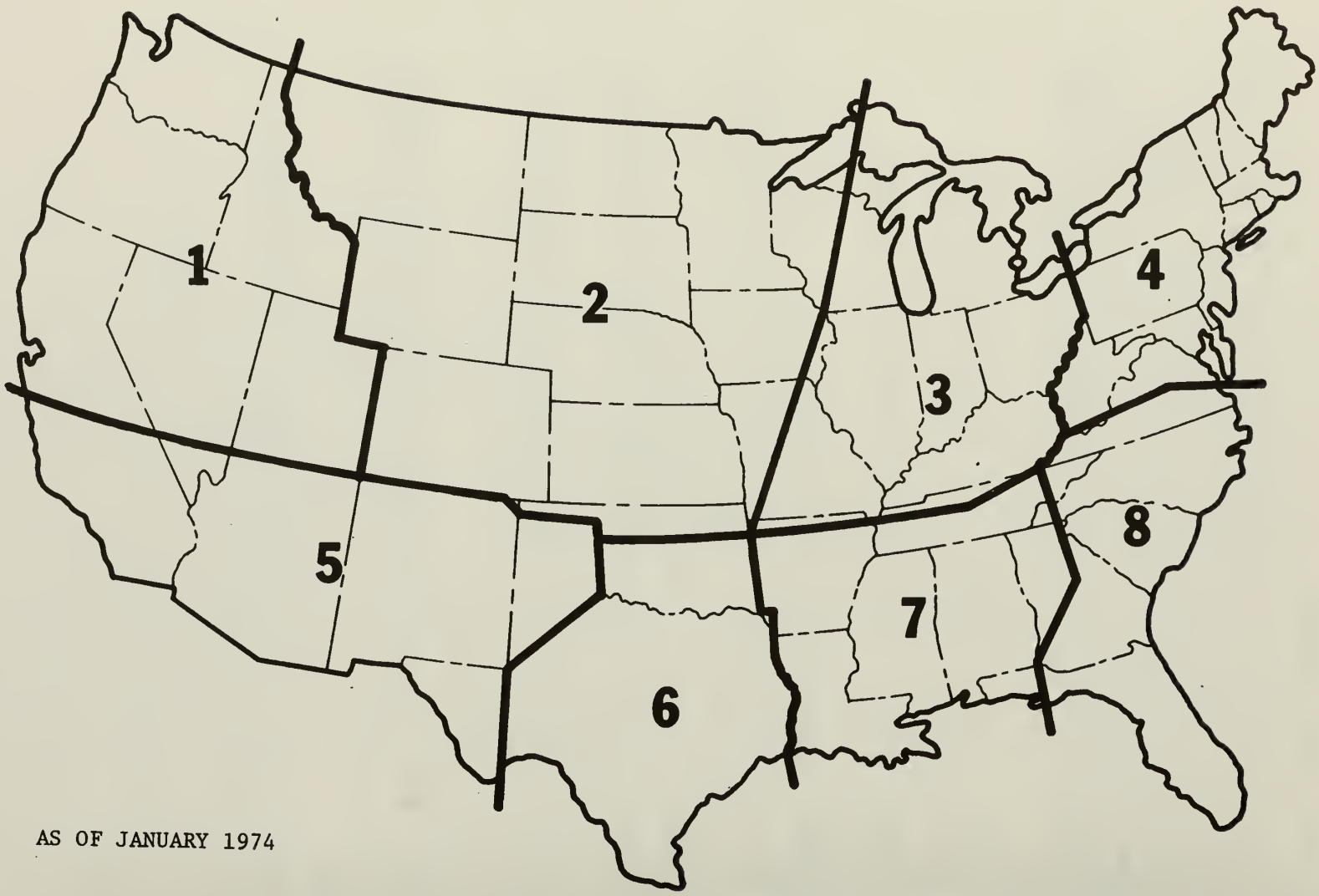


Figure 4-8.

COMET Collecting and Disseminating System.

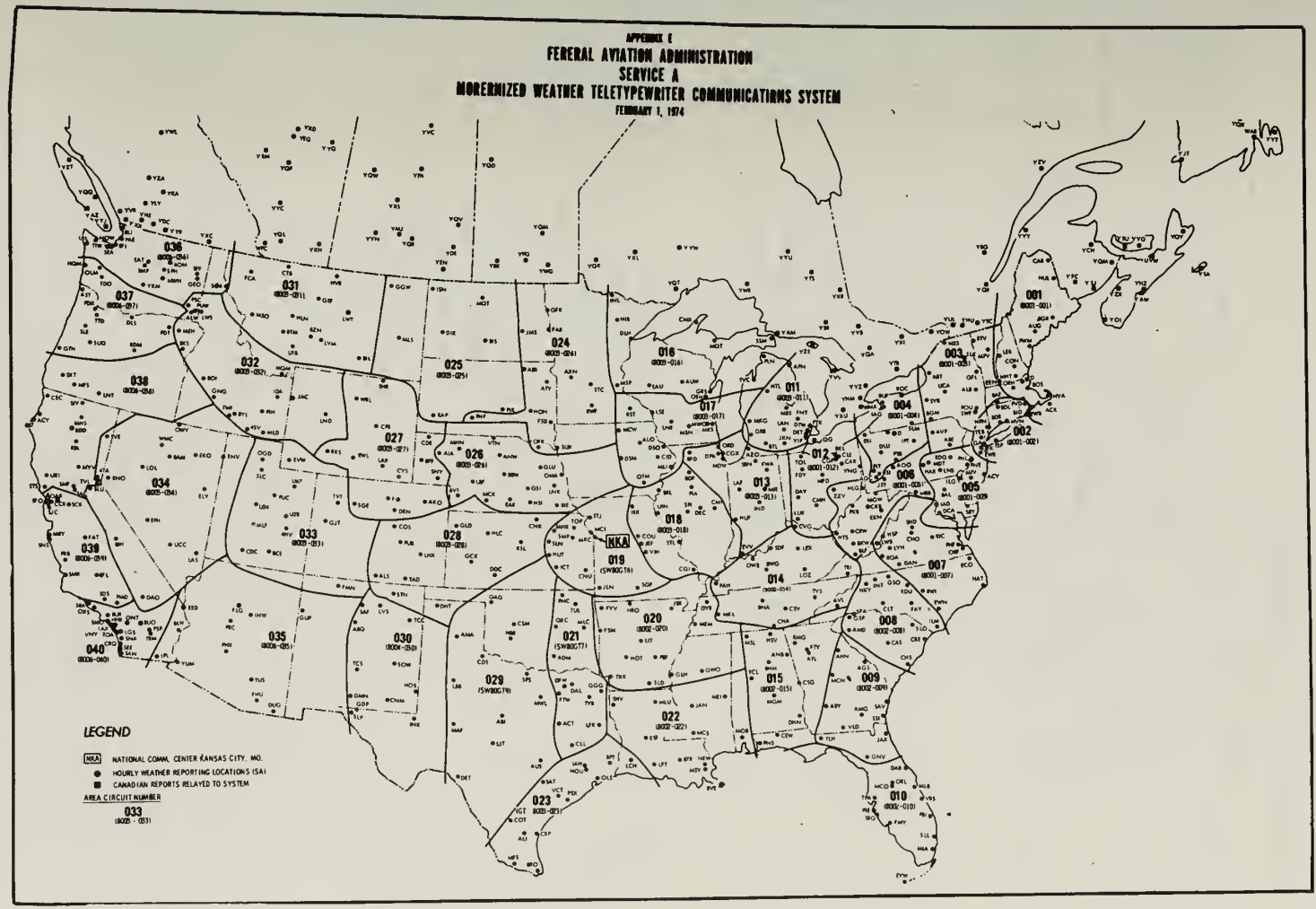


Figure 4-9.

SERVICE A TELETYPEWRITER SYSTEM.

CHAPTER 5

OBSERVATIONS

1. Radar Observing and Reporting Plans

a. Radar data, which are routinely used in the support of this Plan and in the preparation of National Severe Storms Forecast Center (NSSFC) and Air Force Global Weather Central (AFGWC) products, are available from radars of the U.S. Basic Weather Radar Network (fig. 5-1). This Network is composed mainly of National Weather Service WSR-57 radars, supplemented by U.S. Air Force weather radars. In the western intermountain region, air traffic control radars remoted into the Salt Lake City, Utah, Palmdale, Calif., Albuquerque, N. Mex., and Auburn, Wash., Air Route Traffic Control Centers (ARTCC) are used as substitutes for weather-dedicated radars.

National Weather Service personnel at Palmdale, Albuquerque, and Auburn develop a composite of the radar data from radars remoted into these sites and transmit the data on an interagency (Atomic Energy Commission and National Weather Service) facsimile circuit to the National Weather Service Radar Unit at the Salt Lake City ARTCC. These data are then collated with the Salt Lake City radar data, and, by means of a data-telephone link, the final composite is sent to the Radar Analysis and Development Unit (RADU) at Kansas City for use in the Radar Summary Chart, and to AFGWC for use in meeting AWS requirements.

(1) National Weather Service radar observations, other than those from these four ARTCCs, are transmitted hourly on the Radar Report and Warning Coordination (RAWARC) circuits at H + 35 in RAREP (Radar Report) code. More frequent observations are taken and transmitted on RAWARC in severe weather situations. Hourly composites from ARTCCs are transmitted to a number of offices in the western intermountain region on the interagency facsimile circuit. Each ARTCC Radar Unit prepares a narrative summary of its composite and transmits the summary on RAWARC. These summaries and selected hourly radar observations are transmitted hourly on selected Service A circuits by the Modernized Weather Teleprinter Communications System (MWTCS) in Kansas City.

(2) At H + 40, radar reports in the RAREP code from the Air Weather Service (AWS) radar stations assigned to the U.S. Basic Weather Radar Network are forwarded to AFGWC from the Carswell Automated Digital Weather Switch (CADWS) by means of the data link. The NSSFC receives routine military radar weather observations from the CADWS through the FAA Weather Message Switching Center (WMSC). Severe military RAREPs (those describing tornadoes, severe thunderstorms, or hail observations and carrying the bulletin heading WOUS) are obtained by dual means; (1) a drop on the COMET IIB system; and (2) through the FAA WMSC.

(3) The National Weather Service, Air Force, and Navy operate a number of non-network radar facilities. Used primarily for local forecasting and warning and for immediate service to local agencies, these radars

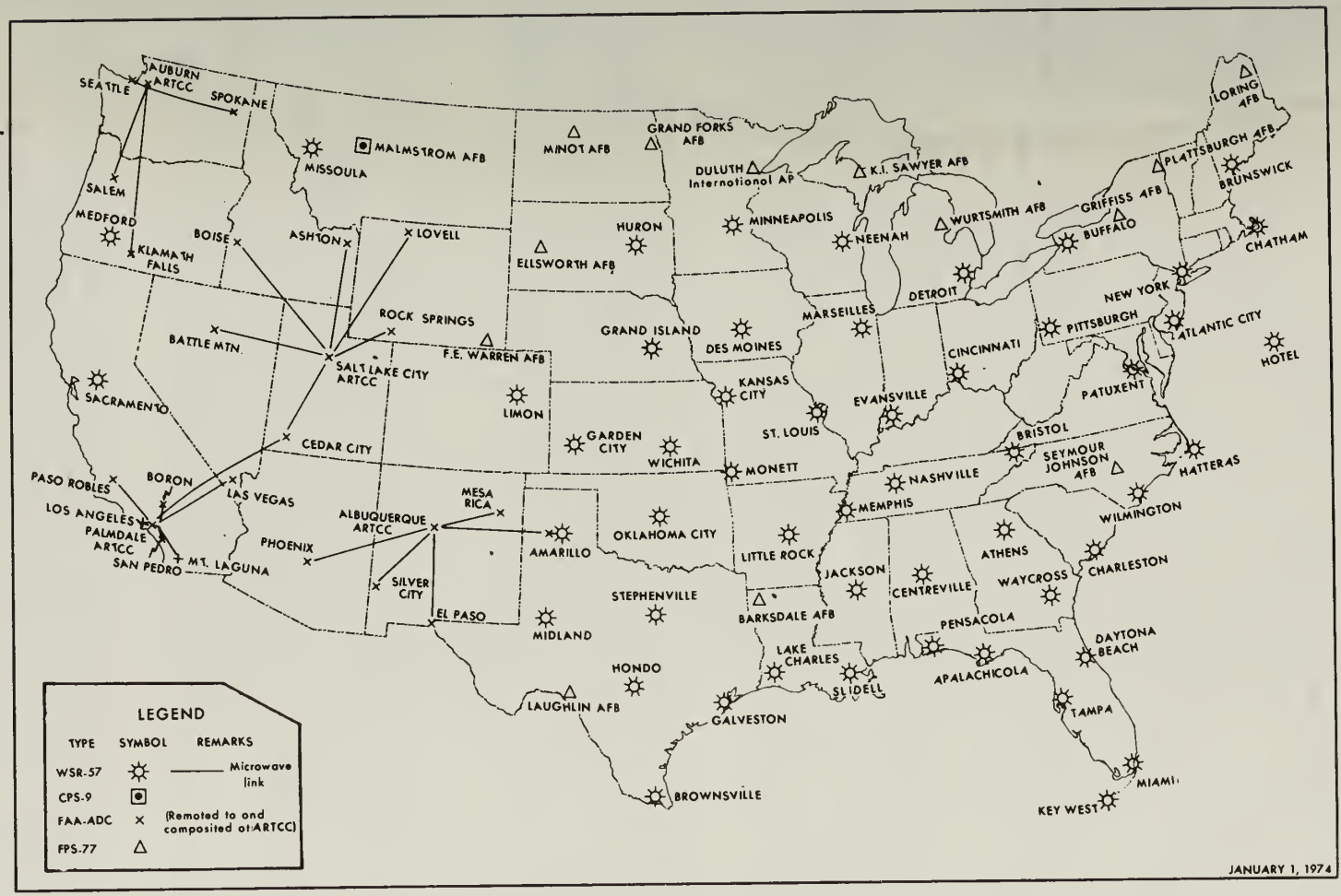


Figure 5-1.

U.S. Basic Weather Radar Network.

also provide selected information on severe storms. For example, all USAF radar facilities in the conterminous United States, whether or not they are assigned Network responsibilities, report radar-detected hailstorms, severe thunderstorms, and tornadoes both on COMET IIA communications and by telephone to the nearest Weather Service Office (WSO) of the National Weather Service, when so requested. Furthermore, all U.S. Air Force storm detection radar facilities, whether on the network or not, transmit hourly RAREPS and necessary specials whenever their station is covered by a Military Weather Advisory area or point warning calling for tornadoes or severe thunderstorms, unless they are within 30nm of a network reporting station.

b. A number of Aerospace Defense Command (ADC) radar sites are capable of limited detection and interpretation of weather echoes. Appendix 2 lists the six AWS units supporting the six ADC air divisions (ADs) with a map of radar site locations. Operational commitments permitting, these sites can provide limited supplementary data upon request. Contact should be made by calling the appropriate AD weather station. In general, either AFGWC or the supervising forecaster of the Severe Local Storms (SELS) Unit or RADU should attempt to contact a particular site through its associated AD weather station.

c. Whenever radar data from stations of the U.S. Basic Weather Radar Network are missing or appear to be in error, the military agencies and the National Weather Service have authorized the following:

(1) The RADU will telephone the military station and AFGWC will telephone (if necessary) the WSO for the missing data or clarification. Because RADU does not have the capability for obtaining such data through the COMET II System, the telephone must be utilized. In most cases where radar data from a WSO are missing or in error, RADU will usually obtain corrected data from that Office by means of RAWARC. Clarification of missing data will usually be available to AFGWC through this means. If such data are not forthcoming after a reasonable wait, AFGWC should contact the Radar Unit at the WSO by telephone.

(2) The Air Force shall provide NSSFC with telephone numbers of stations in the U.S. Basic Weather Radar Network. Telephone numbers of local-use radar stations will also be provided for use in emergency situations. The National Weather Service shall provide AFGWC with similar telephone numbers for its radar stations.

(3) If Federal Telecommunications System (FTS) or Department of Defense (DOD) telephone lines are not available, commercial telephone shall be used.

d. If a WSO needs radar data from a nearby military radar (Network, ADC, or local use), such data can be obtained by local arrangements between the National Weather Service Meteorologist-in-Charge/Official-in-Charge and the AWS Detachment Commanding Officer or the NAVWEASERV Commanding Officer/ Officer-in-charge of the activity operating the radar facility. Authorizations for such arrangements have been completed between the National Weather Service and the military agencies in prior agreements. These data will be supplied on a noninterference basis and should usually be limited to severe weather situations.

2. Rawinsonde-Observing Stations

a. Rawinsonde observations are scheduled twice daily, 0000Z and 1200Z, at the 71 stations in the National Weather Service and Military Upper Air Network (fig. 5-2). These stations also take special observations whenever required and requested by the agency concerned.

Transponder capability is available at 33 stations to permit more accurate measurement of upper winds under strong wind conditions. Evaluated data from the routine soundings are transmitted over the Service C and COMET II teletypewriter systems in the radiosonde code. Data from special soundings requested for potential or existing severe weather situations are transmitted by means of RAWARC and other appropriate communications circuits to NSSFC and AFGWC. Special soundings transmitted on RAWARC will use the standard upper air message heading to assure their relay to AFGWC.

b. Low-level soundings in support of the Air Pollution Control Meteorological Services program are taken at the 9 stations shown in figure 5-3. These stations take observations to 700 millibars near sunrise and around noon, Monday through Friday. During critical air pollution situations, observations are taken 7 days a week. Data for the sounding taken near sunrise in the eastern half of the United States are transmitted on the Service C circuit at 1424Z and relayed, as necessary, to NSSFC and AFGWC. Data for the other soundings are transmitted on an unscheduled basis.

The DOD takes unscheduled observations at a number of schools, at mobile locations, and at research, development, test, and evaluation facilities. However, because of the irregular scheduling of these observations, the military agencies concerned do not deem it advisable to include all of the observations in this Plan. Non-network upper air stations which might be sources of data are given in table 1.

During the months of April, May, and June when the National Severe Storms Laboratory (NSSL) at Norman, Okla., and other agencies are usually engaged in an intensive severe local storms data collection program in central Oklahoma, upper air soundings are taken at a number of locations in support of this program. Except for the Army unit at Fort Sill, Okla., these data are processed by computer and are not available for real-time use. Data from Fort Sill are transmitted to NSSFC by means of COMET II. Such soundings are usually terminated at 400 millibars.

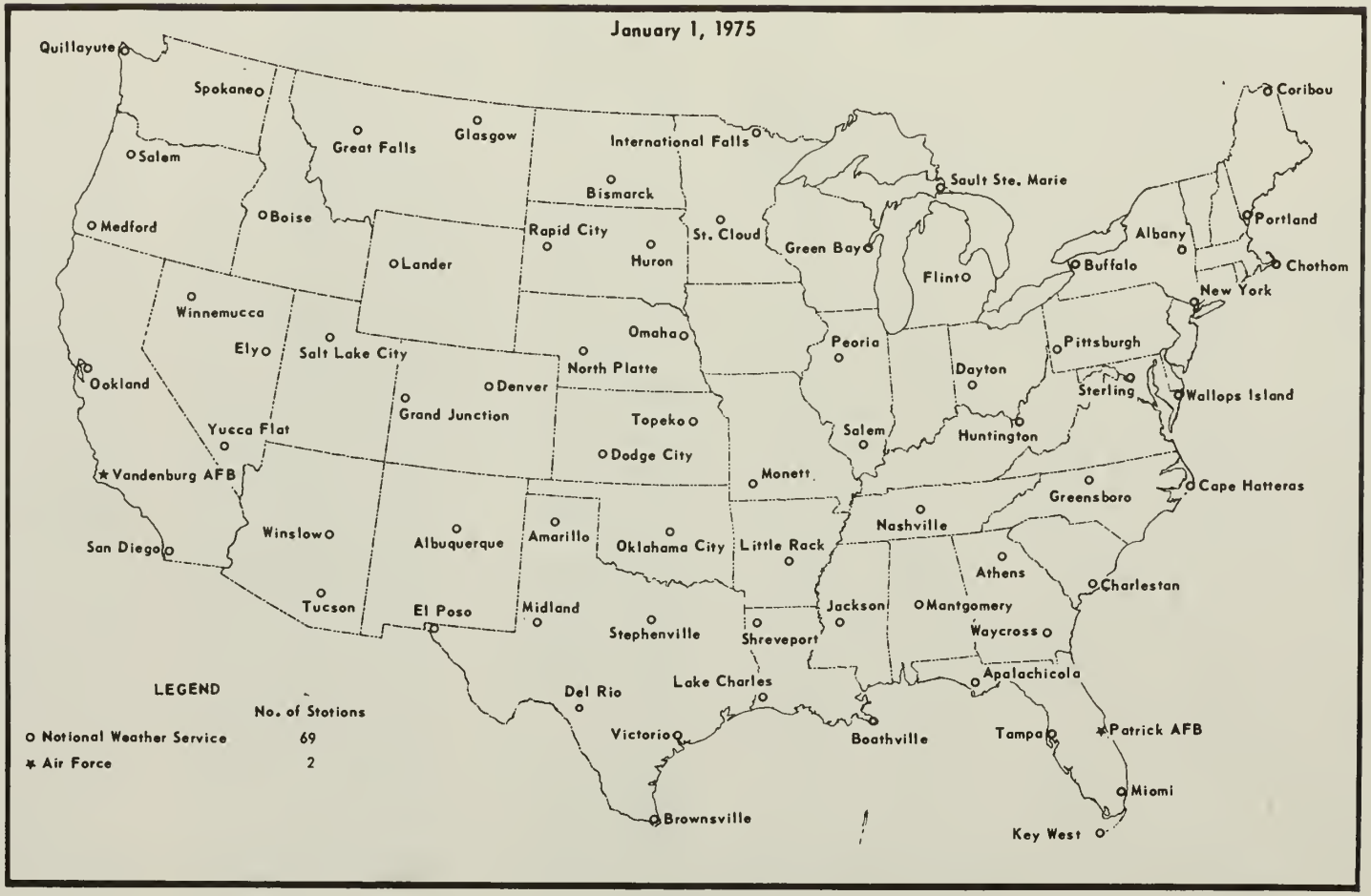


Figure 5-2.

NATIONAL WEATHER SERVICE AND MILITARY UPPER AIR NETWORK.

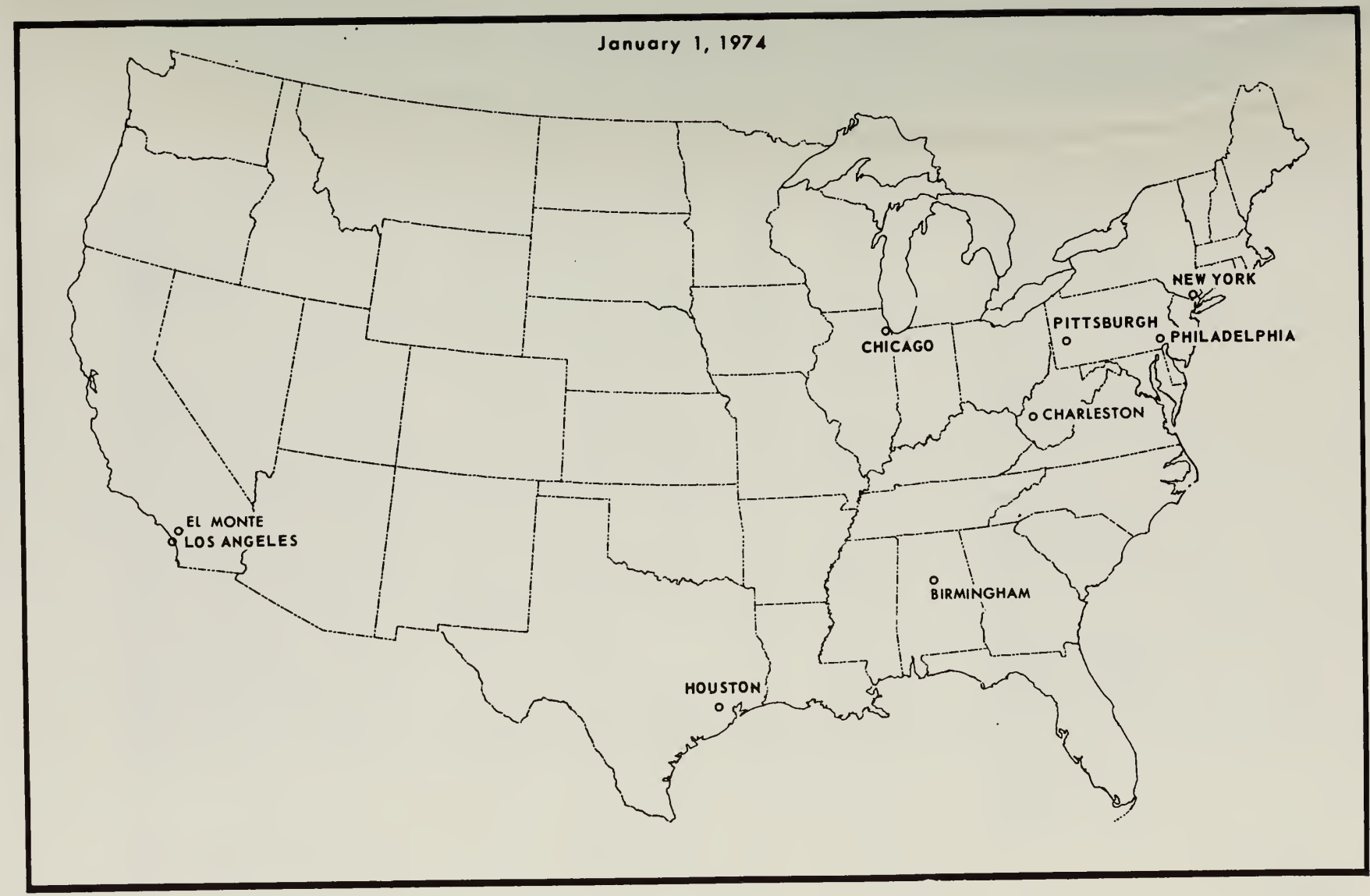


Figure 5-3.

LOW LEVEL SOUNDINGS NETWORK.

TABLE 1. Non-Network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Fort Bragg, N.C.	USA	Unscheduled.	COMET II.	Commander, Det. 3, 16th Wea. Sq.; AUTOVON 236-1807, ask for Wea. Facility.	No
Fort Benning, Ga	USA	Unscheduled.	COMET II.	Commander, Det. 10, 16th Wea. Sq.; AUTOVON 835-7313, ask for Wea. Facility.	No
Fort Sill, Okla.	USA	Unscheduled.	COMET II.	Commander, Det. 11, 16th Wea. Sq.; AUTOVON 639-3200, ask for Wea. Facility.	No
Fort Hood, Tex.	USA	Unscheduled.	COMET II.	Commander, Det. 14, 16th Wea. Sq.; AUTOVON 737-9819 ask for Wea. Facility.	No
Fort Carson, Colo.	USA	Unscheduled.	COMET II.	Commander, Det. 58, 16th Wea. Sq.; AUTOVON 691-3620 ask for Wea. Facility.	No

TABLE 1. Non-Network Upper Air Stations Which Might be Sources of Data--Continued

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
El Centro, Calif.	USAF	Unscheduled.	COMET II.	Commander, OLA, Det. 21, 6th Wea. Wg.; AUTOVON 958-8680.	No
Edwards AFB, Calif.	USAF	Unscheduled.	COMET II.	Commander, Det. 21, 6th Wea. Wg. AUTOVON 350-4318.	No
Cape San Blas, Fla.	USAF	Unscheduled.	COMET II.	Commander, Det. 10, 6th Wea. Wg. (Eglin AFB); AUTOVON 872-5323.	No
White Sands Missile Range, N. Mex.	USA	Unscheduled.	COMET II.	CO, Met. Team, USA Electronics Command; AUTOVON 258-2537, ask for Met. Team.	No

TABLE 1. Non-Network Upper Air Stations Which Might be Sources of Data

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Marshall Space Flight Center, Huntsville, Ala.	NASA	Unscheduled, dependent upon operations.	Local loop to WSO Huntsville, Ala., then to RAWARC.	Bob Turner, FTS 205-453-3109.	Yes
Navy Pacific Missile Range Facility, San Nicolas Island, Calif.	USN Pacific Missile Range	Monday-Friday, 0000Z and 1800Z.	Routinely on Service C.	Tom Carr, commercial 805-982-7173 or 8508; AUTOVON 8-873-1750-7173 or 8508.	No
Navy Pacific Missile Range Facility, Point Mugu, Calif.	USN Pacific Missile Range	Daily, 1200Z. Unscheduled frequent soundings during missions.	None.	Same as above.	No. Will furnish unscheduled or 1200Z upon request.
Chico, Calif.	USAF	Unscheduled.	COMET II.	Commander, Det. 58, 6th Wea. Wg.; AUTOVON 730-1450.	No
Naval Air Technical Training Center, Lakehurst, N.J.	USN	Unscheduled.	None.	Supt. of AG Schools; commercial 201-323-2228; AUTOVON 8-624-2228.	Yes

3. Surface Weather Observational Network. To provide the basic weather data needed for the analyses performed by the National Meteorological Center (NMC), NSSFC, and AFGWC, all available surface data are used. The following stations provide data:

a. The WSOs/WSFOs and Automatic Meteorological Observing Stations (AMOS).

b. The Federal Aviation Administration (FAA) weather-reporting stations--Flight Service Stations (FSS) and Towers.

c. Supplementary Aviation Weather Reporting Stations (SAWRS), including part-time paid, cooperative aviation and synoptic weather-reporting stations, and the U.S. Coast Guard facilities.

d. The DOD weather-reporting stations.

These stations take observations and transmit coded observational data at regularly scheduled intervals. Transmissions are made hourly and even more frequently for aviation purposes, every 3 and 6 hours for synoptic map preparation, and daily for climatological purposes.

4. The FAA Aircraft Pilot Reports (PIREPS).

a. The present FAA Instrument Flight Rules (IFR) regulation (91.125, radio communications, section b.) requires pilots to report "(b) Any unforecast weather conditions encountered; and...".

b. The ARTCCs are requested to pass PIREPS to FSSs which are required to place them on the Service A teletypewriter circuit for distribution (see fig. 4-9).

c. The following significant information should be included in PIREPS whenever it is observed:

(1) Moderate or greater turbulence.

(2) Moderate or greater icing.

(3) Hail encountered.

(4) Location of lines of thunderstorms observed on the airborne radar.

(5) Related maximum-observed cloud tops of thunderstorms.

5. Severe Storm Surveillance by Meteorological Satellites: Several types of data will be available from the various operating meteorological satellites during the severe local storms season. (Figure 5-4 summarizes the operational satellites and data available).

a. NOAA Polar Orbiting Satellites: The NOAA satellites provide coverage of the U.S. twice a day (at approximately 9 a.m. and 9 p.m. local). Properly equipped ground stations can obtain day and night pictures (visible and infrared) from the direct automatic picture transmission (APT) system. High Resolution Picture Transmission (HRPT) is also available. Global visible and infrared data are centrally received, processed, and disseminated to appropriate SFSS's and WSFO's via FOFAX. Soundings from the Vertical Temperature Profile Radiometer (VPTR) taken at 0900 a.m. and 0900 p.m. local are available for NMC analyses, forecasts and teletype transmission on an orbit by orbit basis. High quality data (1 Km resolution) in visible and infrared from the Very High Resolution Radiometer (VHRR) is available twice daily.

(1) Mapped satellite imagery from the direct readout data are usually ready for dissemination within 60-90 minutes after observation time. Digital mosaics covering the U.S. contain data from several orbits.

(2) VHRR sectors for the U.S. can be made available to the Kansas City SFSS within 60 to 90 minutes after observation.

b. Geostationary Operational Environmental Satellite (GOES): SMS-1 (Synchronous Meteorological Satellite), the first operational prototype of the GOES system was launched in May 1974. SMS-B is scheduled for launch in February 1975. SMS-1 is now located at 75°W and SMS-B will be located near 130°W. The principal GOES products are pictures produced at 30 minute intervals. During the daylight hours full resolution (1/2 mile - 1 Km) sectors are produced. During nighttime, equivalent 1 mile IR sectors will be produced. These sectors will eventually be automatically gridded. The products will be delivered in near real time to the SFSS's and WSFO's. In addition to the fixed standard sectors, each SFSS is capable of displaying floating sectors at 1/2, 1 and 2 mile resolution to augment the standard sector coverage.

(1) Satellite Field Services Stations (SFSS): Under the NESS Satellite Field Services Station (SFSS) support concept, GOES imagery will be distributed by the Central Data Distribution Center at the World Weather Building in Marlow Heights, Maryland, to the SFSSs at Miami, San Francisco, Kansas City and Washington. These SFSSs are collocated with the NWS's Weather Service Forecast Offices at those locations. The Kansas City SFSS is responsible for the provision of support to NSSFC and all WSFO's in the Central and Southern portion of the U.S. (The GOES operational data flow is depicted in Figure 5-5).

Satellite	Type of data	Local Time	NESS Products	Methods of Distribution
ESSA 8	APT (direct)	Approx. 1000	1. Analog pictures 2. APT Vidio Signal	FOFAX Telephone WEFAX Direct Data Quality Lines to SFSS's & WSFO's display units from the CDDS
NOAA 2, 3, and NOAA 4#	SR (stored) DRSR (direct) VTPR VHRR	0900-2100	1. Mapped digitized SR 2. Sea-surface temp. analysis 3. Moisture analyses 4. Temperature soundings	
SMS-1 (GOES-East) SMS-2* (GOES-West)	VISSR	Every 30 min. (except for preventative maintenance down times to be determined)	1. 4 n.mi. Resolution IR (Full Disk) 2. 2 n.mi. Resolution VIS Sectors 3. 1 n.mi. Resolution VIS Sectors 4. 1/2 n.mi. Resolution VIS Sectors 5. Equivalent IR Sectors (4 mi. Resolution, with equivalent 1 mile sector geographical coverage)	
DMSP	HR VHR IR WHR	Early morning/evening noon/midnight	AFGWC Products 1. 3 hourly 3-Dimensional Nephanalysis 2. Mapped HR and IR displays 3. Real time VHR and WHR displays	

APT - Automatic Picture Transmission
AVCS - Advanced Vidicon Camera System
CDDS - Central Data Distribution System
DRSR - Direct Readout Scanning Radiometer
ESSA - Environmental Survey Satellite
FOFAX - Forecast Office Facsimile Network
GOES - Geostationary Operational Environmental Satellite

ITOS - Improved TIROS Operational Satellite
PM - Preventative Maintenance
SMS-1 - Synchronous Meteorological Satellite No. 1 (East)
SMS-2 - Synchronous Meteorological Satellite No. 2 (West)
VHRR - Very High Resolution Radiometer
VISSR - Visual-Infrared Spin-Scan Radiometer
VTPR - Vertical Temperature Profile Radiometer
WEFAX - Weather Facsimile
HR - DMSP High Resolution Video Data (2NM)
IR - DMSP Infra-red Data (2NM)
VHR - DMSP Very High Resolution Video Data (1/3NM)
WHR - DMSP Very High Resolution Infra-Red Data (1/3 NM)

#As of 1 October 74 NOAA 3 was the primary operational spacecraft and NOAA 2 was backup. After successful launch and check out, NOAA 4 will become primary; NOAA 3 backup, and NOAA 2 will be deactivated.

*SMS-B (SMS-2 after launch) scheduled for launch in February 1975.

Figure 5-4.

SATELLITE AND SATELLITE DATA AVAILABILITY FOR 1975 SEVERE LOCAL STORMS SEASON.

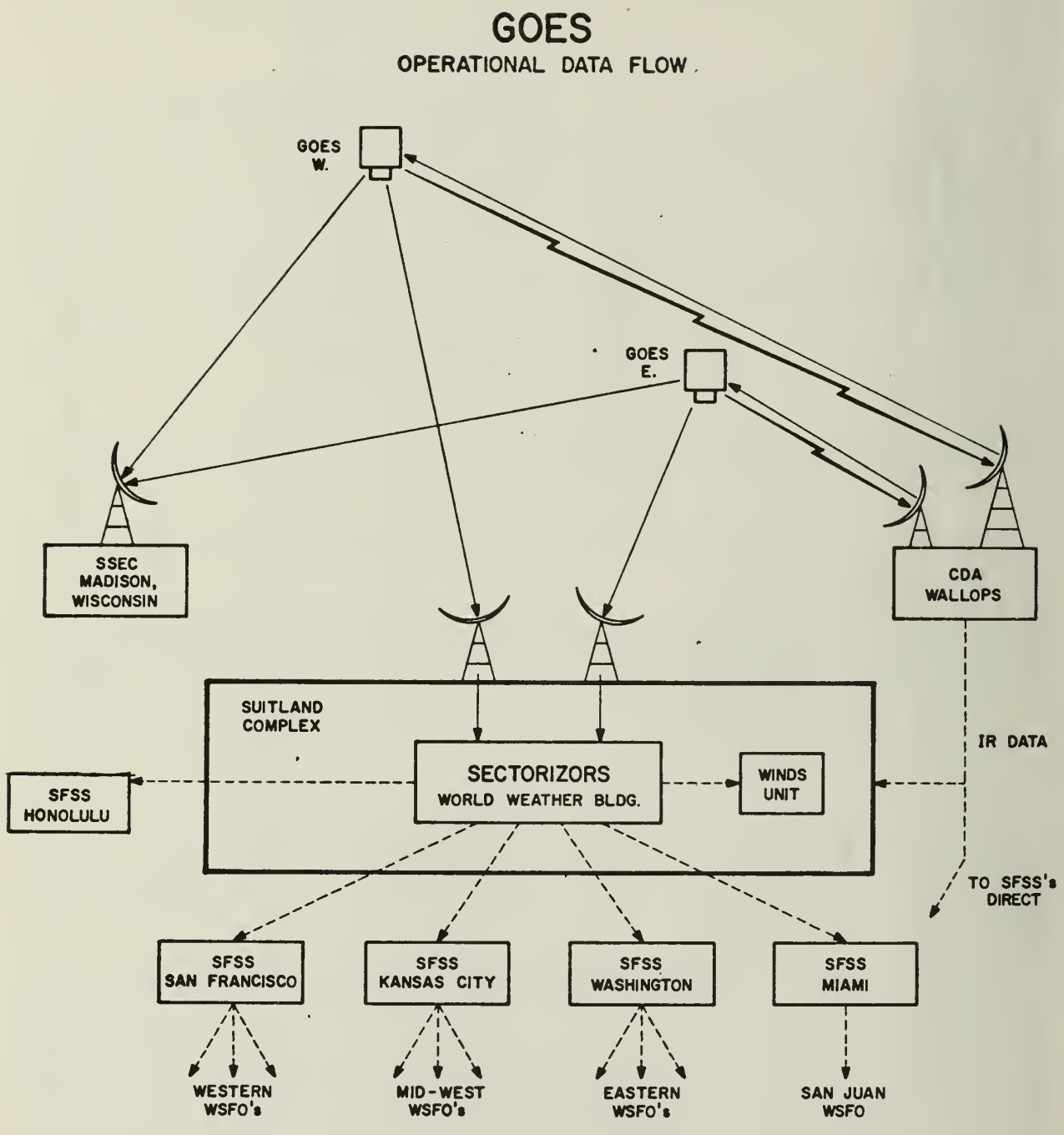

GOES
OPERATIONAL DATA FLOW
GOES W.
GOES E.
SSEC MADISON, WISCONSIN
CDA WALLOPS
SUITLAND COMPLEX
SECTORIZORS
WORLD WEATHER BLDG.
WINDS UNIT
SFSS HONOLULU
IR DATA
TO SFSS's DIRECT
SFSS SAN FRANCISCO
SFSS KANSAS CITY
SFSS WASHINGTON
SFSS MIAMI
WESTERN WSFO's
MID-WEST WSFO's
EASTERN WSFO's
SAN JUAN WSFO

Figure 5-5.

(2) The Kansas City SFSS will continuously produce, analyze, monitor and disseminate all products received from the GOES and advise NSSFC and appropriate WSFO's of areas of observed and suspected severe storm activity. The Kansas City SFSS phone number is 816-374-2102 and operates 24 hours per day.

c. Applications Technology Satellite (ATS): On December 10, 1974, ATS was removed from NOAA Operational Control and returned to NASA. However, in case of failure of SMS-1 and SMS-2, the ATS would be recalled for operational use in order to provide the necessary meteorological coverage of the U.S.

Figure 5-4 presents a summation of the satellites and the satellite data that will be available during the 1975 Severe Local Storms Season.

d. DOD Defense Meteorological Satellite Program (DMSP): This is a DOD managed system to collect and process meteorological data from space-borne sensors. These data are processed by the AFGWC and are available for timely application to severe weather forecasting. DMSP data is currently archived by NOAA/NESS at the University of Wisconsin and is available for use in severe weather research and development.

6. Severe Local Storm Actions of Nonmeteorological Agencies and Individuals. The National Weather Service uses observations of severe local storms activity, particularly tornadoes, from many nonmeteorological agencies and personnel such as: utility companies, State Highway Patrols, local police departments, road maintenance patrols, citizen spotters (network), cooperative National Weather Service climatological observers, Citizen Band radio groups, local Civil Defense Organizations, radio and television station mobile units, city employees (for example, the Chicago Sanitary District), FAA, and individual citizens.

Reports are received by various means--which are not uniform at each WSO--including Citizen Band or Civil Defense radio facilities (with a transceiver often located in the WSO and manned by local cooperators), police radio, direct telephone lines involving unlisted numbers, the National Warning System (NAWAS), State Highway Patrols, teletypewriter circuits by means of telephone or a sending "drop" on statewide NOAA Weather Wire Service (NWWS) circuits, and Service A teletypewriter circuits.

Reports are disseminated to mass news disseminators, to other WSOs, and to safety agencies by NWWS circuits (first priority, except for a more expedient means in some local areas), RAWARC, NAWAS, telephones (hotlines and commercial), NOAA Weather Radio direct commercial radio broadcasts, telephone recordings, and Civil Defense radio facilities. The "fan-out" principle is utilized wherever practical.

7. Aircraft Reconnaissance Data from the Gulf of Mexico. Because observational data are sparse in the Gulf of Mexico, use is made of the Air Force Air Weather Service reconnaissance flight Gull Foxtrot (see fig. 5-6). This track was designed by AFGWC and NSSFC to yield the maximum amount of data pertinent to the severe local storms program. The track is flown on an "as required" basis. AFGWC is the single agency authorized to request Gull Foxtrot flights. The function of coordinating and contacting the AFGWC for Gull Foxtrot Flights is assigned to WSFO New Orleans, Louisiana. AFGWC has the option of specifying tracks other than Gull Foxtrot when necessitated by operational requirements or the synoptic situation. Gull Foxtrot data enter Air Force communications via an air/ground station and reconnaissance monitor. Data are transmitted to the Carswell Automated Digital Weather Switch and from there are made available to RAWARC via the Carswell-Suitland link.

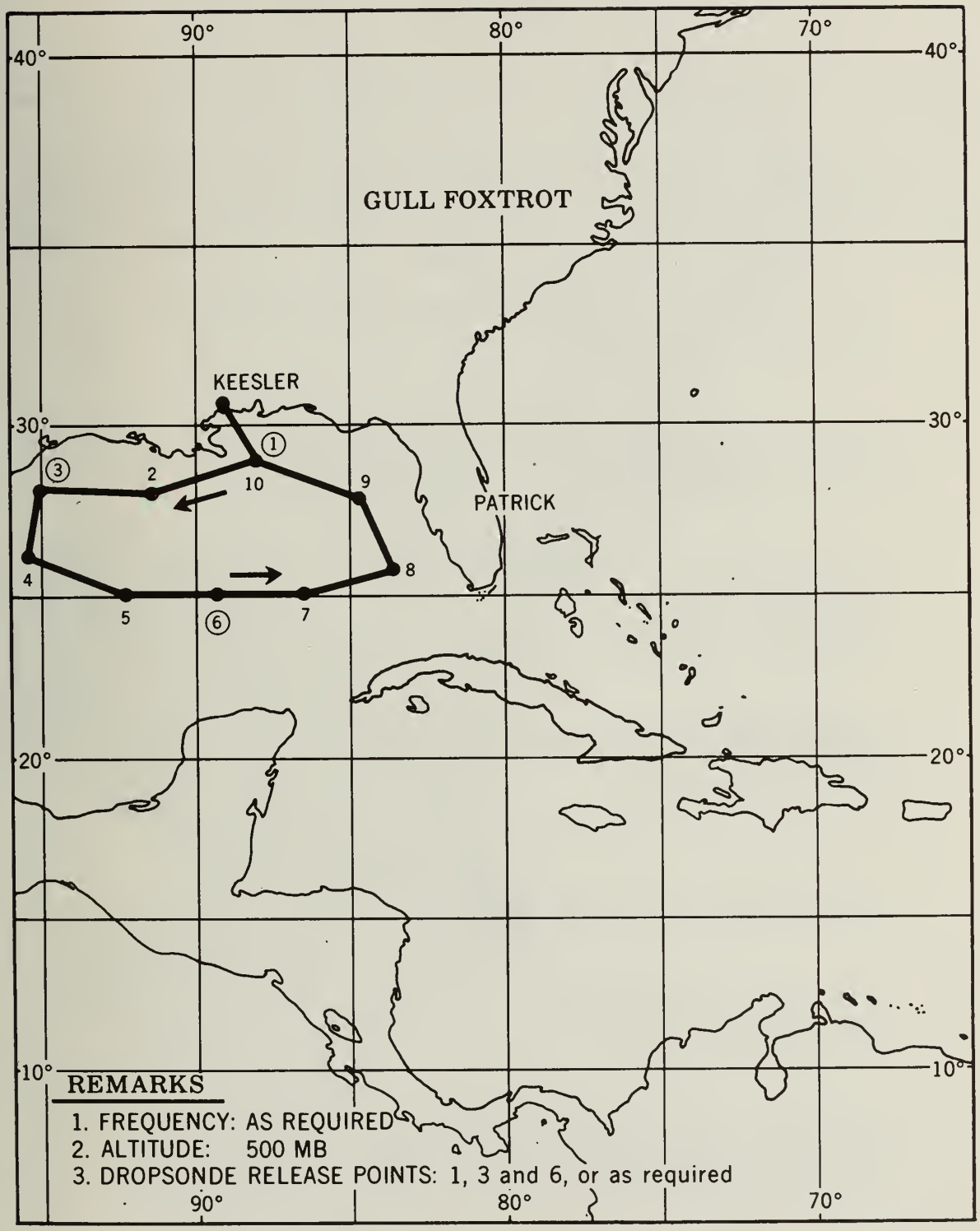


Figure 5-6.

WEATHER RECONNAISSANCE FLIGHT GULL FOXTROT.

CHAPTER 6

PUBLICITY

The Military Weather Advisories and Point Warnings of the Air Force Global Weather Central (AFGWC) are designed for specialized military users and shall not be released to the public. News media releases that concern the cooperative efforts in severe storms activities of the Department of Defense and NOAA weather services and of other agencies should reflect the joint nature of these efforts by giving due credit to participating agencies. Copies of these releases should be forwarded to:

Deputy Director for Operations/Environmental Services
The Joint Chiefs of Staff
Washington, D.C. 20301

Assistant for Weather, DCS/P&R
United States Air Force
Washington, D.C. 20330

Assistant Chief of Staff for Intelligence
Department of the Army
Attention: DAMI-DOT-C
Washington, D.C. 20310

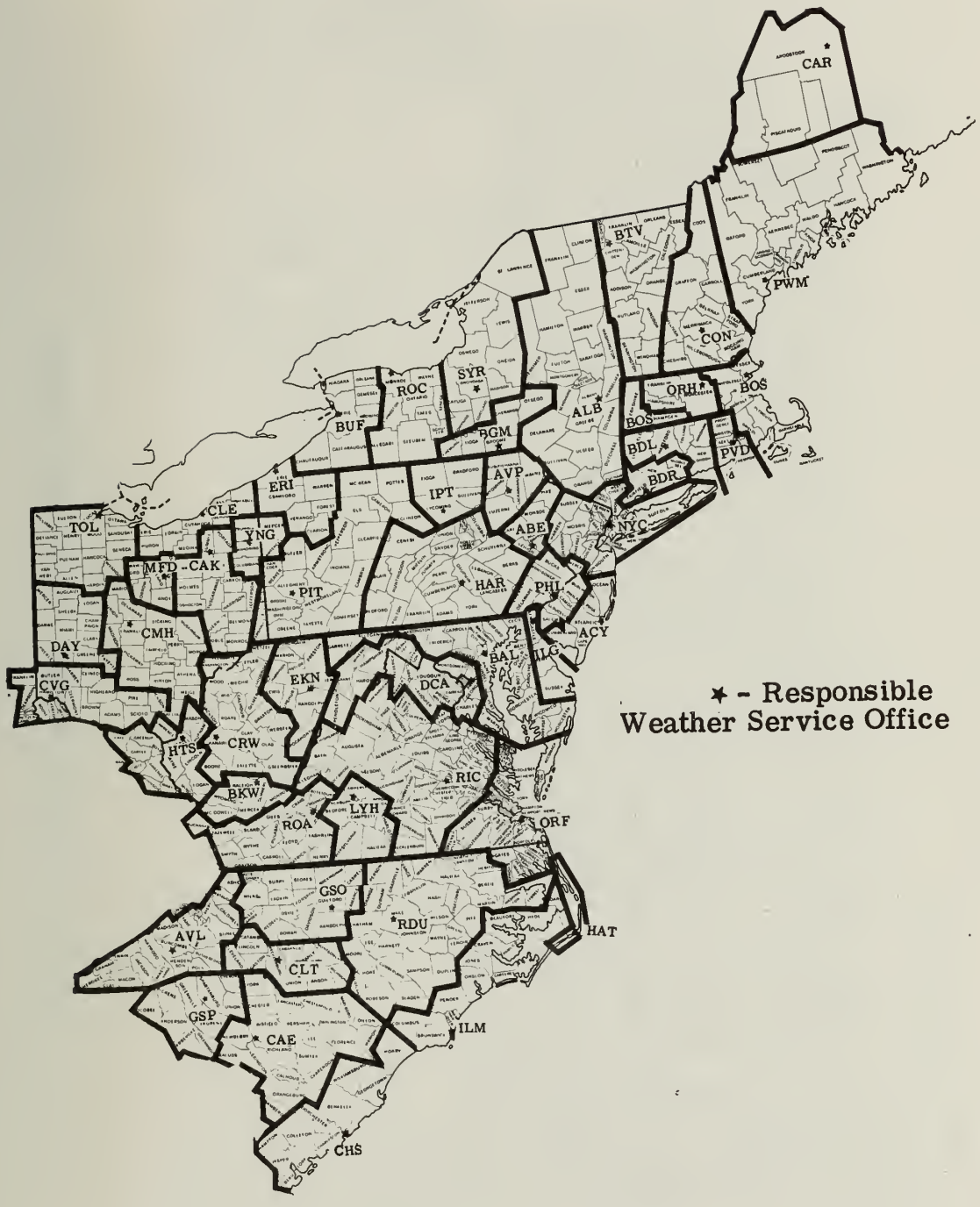
Headquarters, Naval Weather Service Command
Building 200
Washington Navy Yard
Washington, D.C. 20374

Headquarters, Air Weather Service (AWS/CS)
Scott Air Force Base, Ill. 62225

NOAA Public Affairs Office
6010 Executive Boulevard
Rockville, Md. 20852

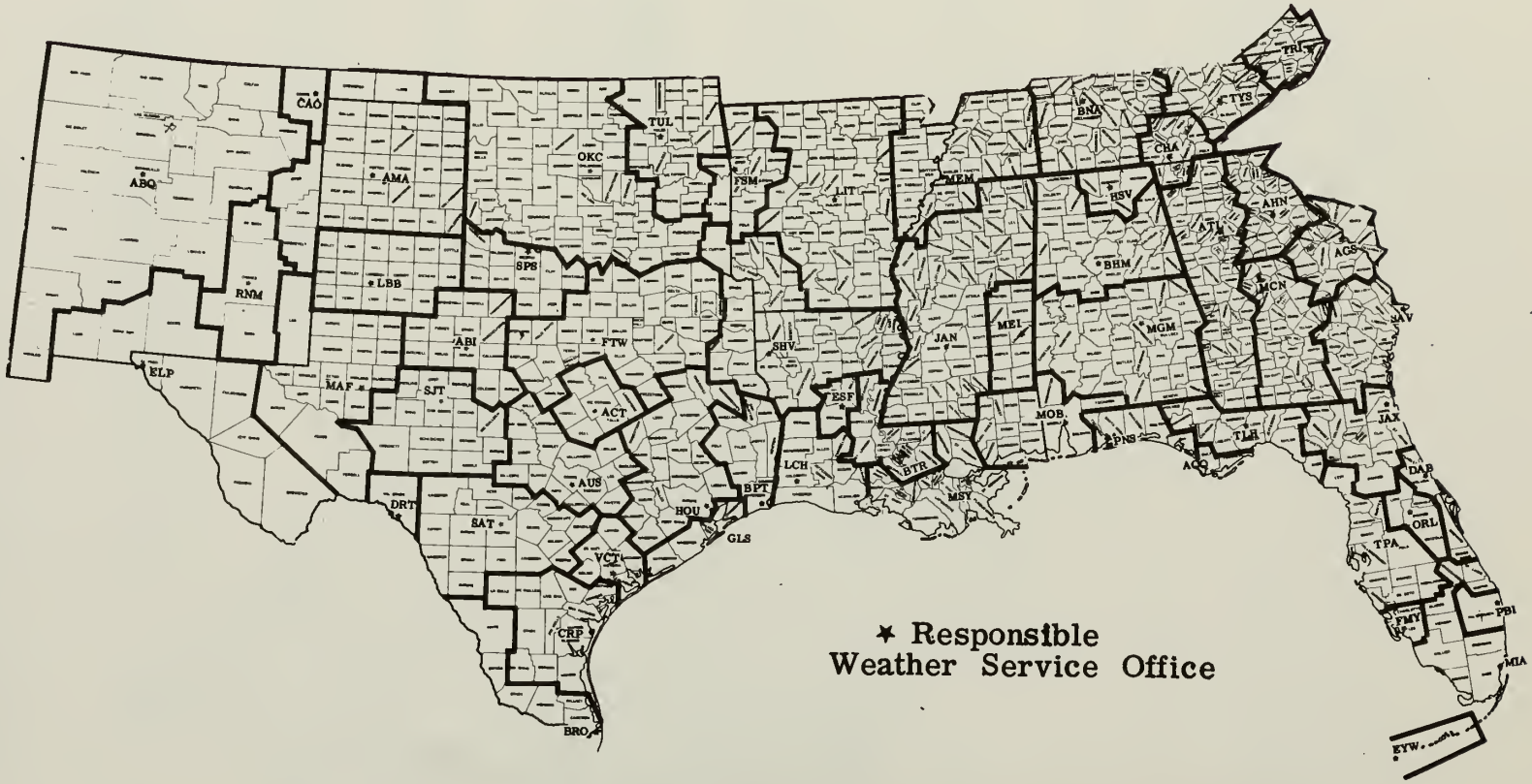
Commandant, United States Marine Corps
Headquarters, United States Marine Corps
Washington, D.C. 20380

APPENDIX 1

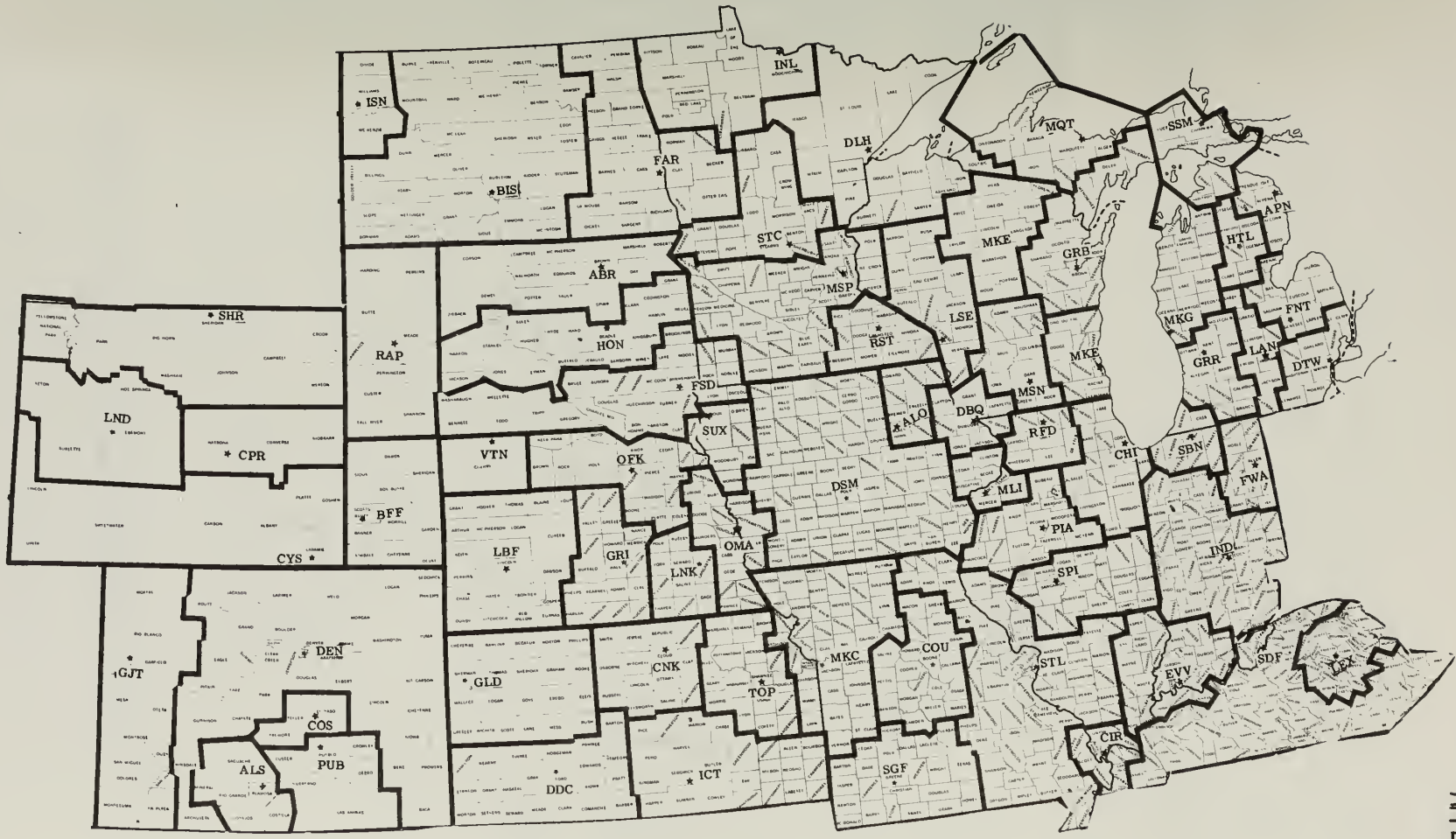


★ - Responsible Weather Service Office

COUNTY WARNING AREAS - EASTERN REGION



COUNTY WARNING AREAS - SOUTHERN REGION

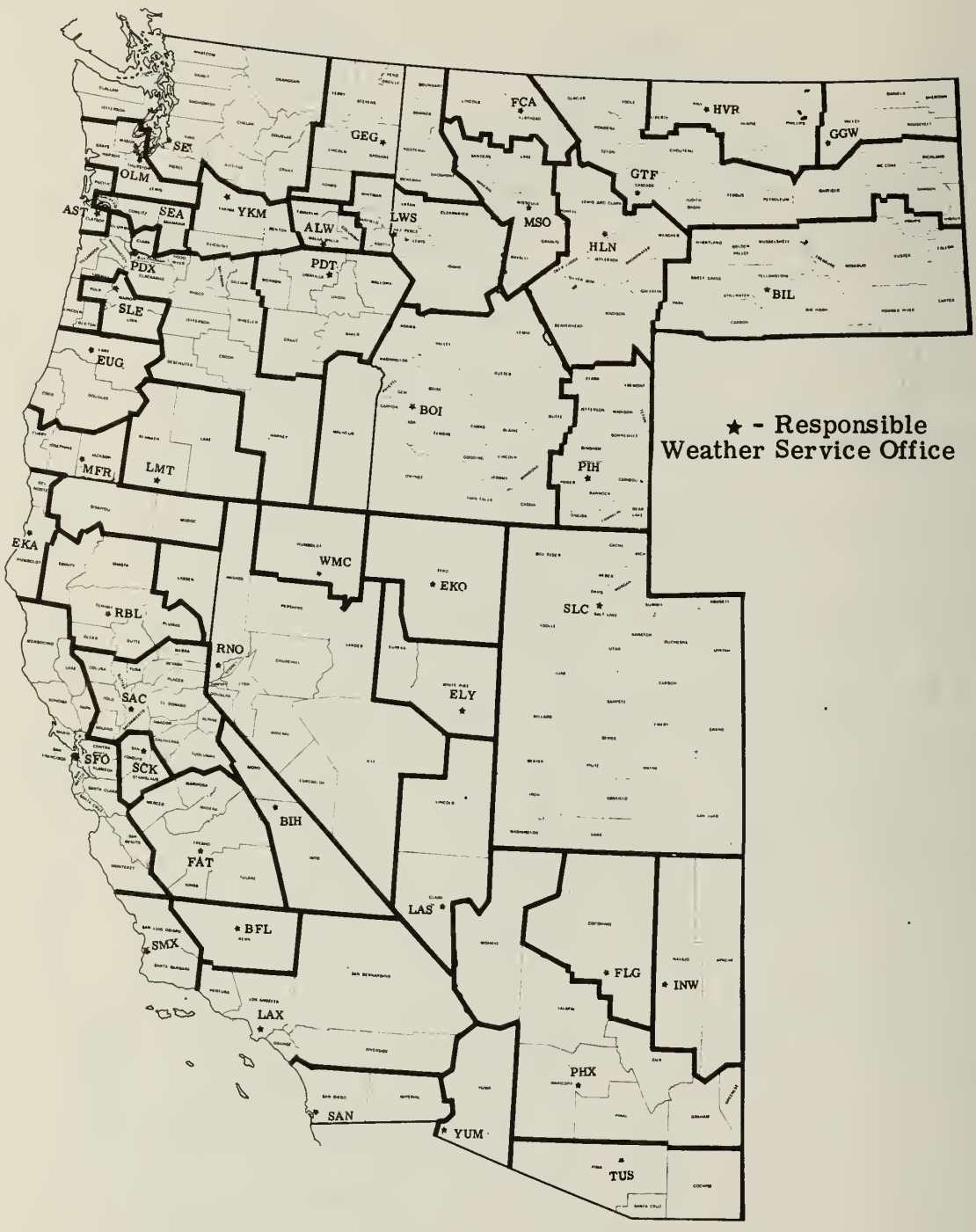


* - Responsible
Weather Service Office

COUNTY WARNING AREAS - CENTRAL REGION

APPENDIX 1

APPENDIX 1



COUNTY WARNING AREAS - WESTERN REGION

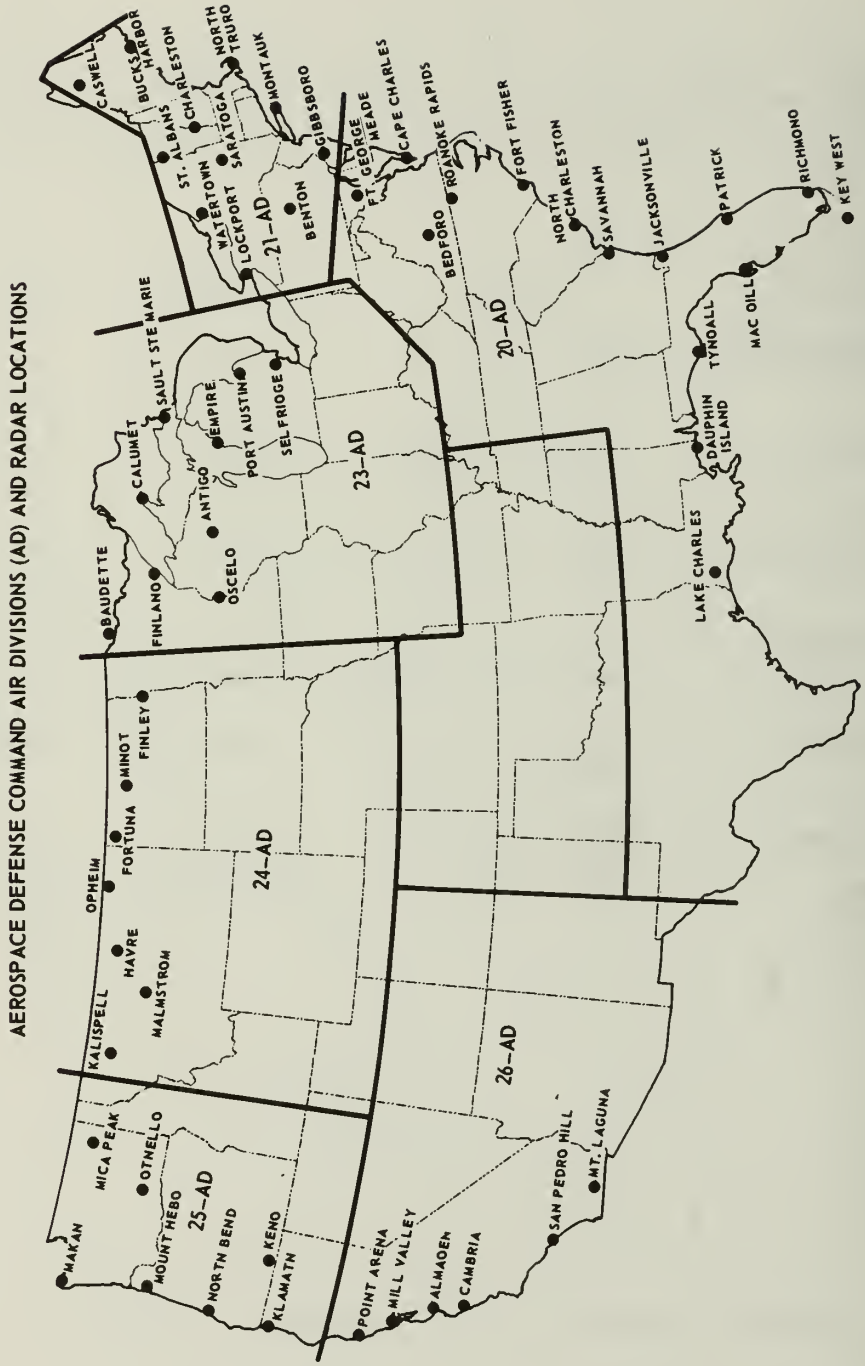
APPENDIX 2

AEROSPACE DEFENSE COMMAND (ADC)
WEATHER STATIONS AND AREAS OF RESPONSIBILITY

The following AWS units supporting ADC air divisions can obtain appropriate operational permission and contact radar sites within the division area of responsibility. See attached map for division areas and location of radar sites.

Air Division (General Area of Responsibility)	AWS Unit	Autovon Number	FTS Number
20 AD (Southeast)	Det 41, 12 WS Ft Lee AFS VA	687-4008 Ext 765	804-732-7256 Ext 765
21 AD (Northeast)	Det 27, 12 WS Hancock Fld NY	587-9620	315-458-5500 Ext 620
23 AD (N Central)	Det 8, 12 WS Duluth IAP MN	825-8765	218-727-8211 Ext 765
24 AD (N Plains)	Det 3, 12 WS Malmstrom AFB MT	728-1500 Ext 6765	406-731-6765
25 AD (Northwest)	Det 4, 12 WS McChord AFB WA	976-6765	206-984-6766
26 AD (Southwest)	Det 11, 12 WS Luke AFB AZ	853-2611 Ext 765	602-935-2611 Ext 765

APPENDIX 2


AEROSPACE DEFENSE COMMAND AIR DIVISIONS (AD) AND RADAR LOCATIONS
CASWELL
BUCKS HARBOR
ST. ALBANS
CHARLESTON
NORTH TRURO
WATERTOWN
SARATOGA
MONTAUK
LOCKPORT
BENTON
GIBBSBORO
21-AD
FT. GEORGE MEADE
CAPE CHARLES
BEDFORO
ROANOKE RAPIDS
FORT FISHER
NORTH CHARLESTON
SAVANNAH
JACKSONVILLE
PATRICK
RICHMOND
KEY WEST
MAC DILL
TYNDALL
DAUPHIN ISLAND
LAKE CHARLES
20-AD
SAULT STE MARIE
CALUMET
EMPIRE
PORT AUSTIN
SELFRIDGE
ANTIGO
OSCELO
BAUDETTE
FINLANO
23-AD
MINOT
FINLEY
OPHEIM
FORTUNA
HAVRE
MALMSTROM
KALISPELL
24-AD
MICA PEAK
OTHELLO
MOUNT HEBO
25-AD
NORTH BEND
KENO
KLAMATH
MAKAN
POINT ARENA
MILL VALLEY
ALMADEN
CAMBRIA
26-AD
SAN PEDRO HILL
MT. LAGUNA

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3 0112 084234506